

The Growth of U. S. Naval Cadets.

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The study of the growth and the development of the human subject has always been one of great interest, not only to the physiologist and statistician, but also to the general reader. While, however, growth seems to be the most natural thing that occurs in the animate world and in living things, some of the mysterious laws that govern the process are still involved in obscurity.

One of the means for the study of *human* development is anthropometry. By it we are enabled to record the progress that has been made in the different dimensions from time to time, and, providing our material is sufficiently large, to form our conclusions accordingly.

Thus it has been the custom at the Naval Academy for the last thirty years or more to make an annual physical examination of every cadet in training at that school, and, at the same time, to keep a record of certain anthropometric measurements of every cadet undergoing such examination. As the material that has accumulated in this manner is now sufficiently large, it would seem as if it were a duty to attempt a systematic study of these valuable records, with the view of contributing something to our present knowledge of the subject of growth.

As regards the nature of the examination itself, it is well known to all interested in the subject of anthropometry from the items that are recorded, and needs, therefore, not be described in detail. Up to a few years ago the height standing, perineal height, circumference of chest, waist measure and the lung capacity were the only items recorded. Within recent years the height sitting, span of arms, strength of squeeze, acuteness of vision and hearing have been added to these records. The number of observations under the first-named items is, consequently, much larger than that under the last named.

The fact that all the measurements are taken and recorded by medical men is sufficient guarantee of their accuracy and adds no little value to the results we may derive from them.

The cadet who stays the full term of four years at this school leaves on the books the records of five successive examinations taken one year apart; after graduation two years are spent at sea, after which time the cadet returns to the Academy for his final examination, leaving the records of another physical examination. This makes six in all. Since the age for entrance into the Academy is limited to from 15 to 18 years, and taking six years as the time necessary to elapse between the first and last examinations, the period of growth covered by these records ranges all the way from 15 to 24 years of age.

The circumstance that the cadets for the Naval Academy are appointed from all parts of the United States by their representatives in Congress ought, in our opinion, to add considerable weight in our attaching to whatever means or averages we may derive from their measurements a certain value, more national in character than can be attributed to the means and averages derived from the measurements of merely local schools and colleges. Besides, another point that is calculated to make our records particularly valuable is the fact that a large percentage of them are continuous records. The number of cadets that enter annually may be said to have varied in the past between 60 and 80, and that of those who graduate between 30 and 40.

It is perhaps also of some importance to mention the fact at the beginning that, from the great preponderance of blue eyes and light brown hair prevailing among Naval Cadets, it is safe to state that the great majority of them are of Anglo-Saxon and Teutonic origin. It is not impossible that the school may have exercised and is still exercising a certain degree of selection from that type of men for its devotees.

STATISTICAL METHODS.

One of the greatest impediments to our progress in the study of growth in this country has undoubtedly been due to the fact that different observers have used different methods of recording the results of their investigations, and, consequently, these results are difficult of comparison.

As regards the methods of investigation used in the present inquiry and those of recording its results, I have adhered to those used by Prof. W. T. Porter in his work on the "Growth of St. Louis Children" as closely as possible and with the view of making my statistics strictly comparable to his.

A brief outline of these methods and our conception of them seems, therefore, essential.

Based on Quetelet's statements made many years ago, it has since been most generally assumed that all anthropometric measurements would be found distributed according to the laws of chance; that a large number of measurements, for instance, of the height of man would arrange themselves on either side of a true height. It has, furthermore, been assumed that this arrangement would be symmetrical on either side of the true height if the number of observations were infinite and if only accidental influences had been at work in each individual measurement in a given series.

Quetelet's theory has since been further developed by Stieda and Ihring and also by Galton. In the same manner Bowditch and Porter have adhered to the theory of Quetelet, and all their investigations are based on this theory.

Quite recently Boas has made the following remarks regarding the theory of Quetelet, viz : "Glancing over the curves representing large series of measurements, it strikes me that they conform to the laws of chance only in a general way and that considerable deviations occur quite frequently. . . . Assuming that there is a uniform ancestral type in a certain district, and that the conditions of life remain stable, we may expect that the people representing its offspring will be grouped around the type according to the laws of chance. Assuming, however, that there were two distinct ancestral types in adjoining districts, and that these types intermingled, we cannot foretell what the distribution of forms among the offspring will be. It may be that they will represent an intermediate type between the parental forms, in which case we might expect to find them distributed according to the laws of chance. But it might also be that they showed a tendency to reproduce one or the other of the ancestral types either pure or slightly modified, in which case the resulting curve would not conform to the laws of chance, but would show an entirely different character."

This view seems to be well taken and deserves our consideration all the more for the reason that the intermingling of different varieties of the same species is a well-known cause for variation. In view of cautionary signals such as the above, some comfort may perhaps be derived concerning our present material of observation from the fact above mentioned, that the preponderating racial type of man under investigation is undoubtedly Teutonic in character. At any rate, a sorting out of types different from the prevailing one being entirely out of the question, especially in the absence of all craniometric data, we have been obliged to follow the example of previous investigators, and will make a brief statement of the various methods employed in the present inquiry, hoping that whatever correction may have to be applied may apply to all alike in the future.

In Table I* are exhibited the observed distributions of the heights of 842 Naval Cadets aged eighteen years.

AVERAGE.—The average (A) was calculated according to Stieda, quoted by Porter, and which means the quotient obtained by dividing the sum (Σ^{α}) of the values (α) obtained in the individual measurements by the whole number of observations $(n): A = \frac{\Sigma^{\alpha}}{n}$. The adjoining Table II will illustrate the method.

MEAN OF MEDIAN VALUE (M) can sometimes be found by the simple inspection of a series, if the number of observations is sufficiently large, but is more exactly determined by the following method, viz : The mean strength of squeeze of the right hand in Table II is obtained by adding the number of observations from above downwards until the sum cannot be increased by the next number in the column without exceeding half the total number of observations. Thus III is reached opposite 75 pounds; the next number below in the column (40) would make the sum 151, which is more than half (112.5) of the total number of observations (225). The mean is, therefore, greater than 75 but less than 80 pounds. Its exact position is found by interpolation. Half of the total number of observations is II2.5, which is I.5 more than the observations up to 75 pounds; I.5 is 3.7 per cent of 40, the observations at 80 pounds. Hence the mean is 75.46.

* The tables referred to will be found in the Appendix.

Some statisticians take the average to be the nearest approach to the typical value, and this seems to be the case whenever the distribution of measurements follows the laws of chance; others look upon the mean to be the better value as representing the type, while still others hold that neither of these values in their present application represents the true type. Bowditch says: "If A represent the average value of all the observations, then the value of M - A will be a measure of the direction and extent of the asymmetry of the curve ST (curve of percentile grades), for this value will be zero when the curve is symmetrical, positive when the values of the lower percentile grades fall short of Mmore than those at the higher grades exceed it, and negative when the reverse is the case." An examination of his table and of the curves constructed from it shows that the asymmetry of the curves of percentile grades varies very much at different ages both in direction and amount. Bowditch states distinctly that "we must conclude, therefore, that the rate of annual increase, both in height and weight, is different at different percentile grades, or, in other words, that large children grow differently from small ones, and, moreover, that between the ages of eleven and fifteen years there is a striking difference in the mode of growth between the two sexes." We will refer to this point of the difference in the growth between tall and small children in some detail later on.

THE PROBABLE DEVIATION.—But neither average nor mean gives us any information as regards the manner in which the individual measurements of a series are distributed, and it is clear that two series with an identical mean or average may yet differ largely in respect of the dispersion of the individuals from the middle value, as the following numbers, taken from Porter, will show:

These have the same average (10).

A very convenient measure of the degree of dispersion or deviation of the individual members of a series from their common mean or average is that afforded by the "probable deviation."

Probable deviation (d) is that deviation from the middle value

which, in a large series of observations, is as often exceeded as attained (Lexis, Porter). According to Boas, the *mean deviation* is more accurate than the probable deviation, which is no doubt true. Inasmuch, however, as the relation between the two must be constant, and as it was one of our objects to make the results of our investigations comparable with those of previous investigators, the preference was given to the probable deviation which was calculated in accordance with the following approximation formula:

$$d = \pm 0.8453 \, \frac{\Sigma \delta}{n} \, .$$

In accordance with this formula all the individual deviations from the middle value (average or mean) of a series must be added together without regard to whether they be plus or minus, and the sum divided by the total number of observations as shown in Table III.

The observed distribution shown in Table III must now be compared with the distribution of the observations of an hypothetical series constructed according to the calculus of probabilities. The observed and the theoretical series should correspond, providing the causes of the deviations are purely accidental. Since it is absolutely required that such a comparison must be made before it can be known whether the observations in any series can be treated by the methods of the theory of probabilities, Table IV is appended.

This table apparently shows that slight deviations do occur, and Bertillon proved this some time ago. Bowditch, also, has shown that the curves, showing the distribution of statures and weights of children, do not follow the laws of chance, by having pointed out the fact that during the period of growth a constant difference exists between the average and the probable values, an observation which we have also been able to confirm, as will be seen later on.

In the preparation of Table IV, Stieda's table, reproduced by Porter, and shown as Table V, has been made use of.

In order to bring out the relation between the theoretical and the observed observations still more clearly, Fig. 1 is appended, which is a graphic representation of Table IV. It is perhaps rather remarkable that the deviations of the observed from the

theoretical curve are greatest about the mean, just where the numbers are largest and where, therefore, the agreement should be expected to be the closest.



FIG. 1. The Calculated and Observed Distribution of the Height of 722 Naval Cadets aged 17. Unbroken line: according to theory. Broken line: according to observation.

PERCENTILE GRADES.—Another method for calculating the distribution of the observations in a series is the percentile method of Galton. According to this method the distribution of the

observations is determined at intervals of 5 or 10 per cent from the median value.

Table VI shows the percentile distribution of 841 Naval Cadets aged 18 years according to this method.

Perhaps the simplest and, at the same time, the truest means for showing the distribution of, for instance, the height (or any other dimension) in a given series would be to arrange the members according to increasing height at intervals of, say, one-half inch, expressing in numbers the members found between every half inch.

The PROBABLE ERROR (E) of the average was determined by the formula $E = \pm \frac{d}{\sqrt{n}}$ (Stieda, Porter), where E = the probable error of eveners

where E = the probable error of average,

d = probable deviation of an individual from the average, n = number of observations in the series.

Table VII represents the values E as calculated according to this formula.

As was mentioned before, for the sake of uniformity and easy comparison, we have, in the preparation and tabulation of our material, adhered as closely as it was possible to the methods used by Porter. The period of growth covered by our tables is from 15 to 24 years of age, or, practically, to the termination of the growing period, although rare instances have occurred in which growth has been noted to have taken place even later. But such instances as these are extremely rare and can scarcely be called the rule. The tables of both Bowditch and Porter practically stop at the age of 16 years, for males at least, because their numbers after that age are very small and therefore not so reliable as those of the preceding ages. It seemed, therefore, that the material at our disposal might in a way be well calculated to complement theirs, and for this reason, if for no other, it would be very desirable to tabulate it so as to make them both in all respects comparable. We have, accordingly, calculated for every year here represented the average and the mean, the median minus average values, the probable deviations and the probable errors, as well as the 5, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 95 percentile grades. The 25th and 75th percentile grades, given in some of the tables, were obtained by dividing by two the sums of the 30th and 20th and of the 80th and 70th percentile grades respectively.

Averages; Means; Median minus Average Values; Probable Deviations.

These values are shown in Tables VIII, IX, X, and XI, and a brief discussion of them seems now in order.

According to Porter, "the mean or average of the observations at any age in the period of growth is typical of the child at that age, and a comparison of the means at different ages will reveal the law of growth of the type. Again, the mean of the observations at any deviation from the mean of the whole number, for example of the height at a deviation of +d from the mean, or, if Galton's method be employed, the height at any percentile grade, is the type of those who stand at a certain degree of deviation from the type of the whole number. Thus the types of tall and short, light and heavy children are secured. The types of the same degree of deviation from the mean at all ages are as comparable as the type of the whole number of observations, and reveal the growth of the typically tall and short, light and heavy children; but the comparison is less secure the greater the deviation from the mean, for the probable error is inversely as the square of the number of observations, and the number of observations rapidly diminishes on either side of the mean."

This beautiful conception regarding the theory of the growth of tall and short children, however, has been quite recently most severely criticized by Boas in "Science." Boas expresses himself as follows: "We know of a number of facts which show plainly that the assumption is incorrect. It has been shown in Dr. Bowditch's tables that Irish children are shorter than American children. If the position of the American child is expressed in percentile grades of the whole Boston series and that of the Irish child in the same manner, it will be seen at once that they diverge more and more with increasing age. Pagliani's measurements of Italian children and my own of Indian tribes of different statures bring out the same point still more strongly."

Under these circumstances it would seem, perhaps, the safer plan to look upon the averages and the means not as the types themselves, but merely as the indices to the true types.

A mere glance at the tables of the averages and means shows at once that development and growth from year to year is anything but uniform and regular. The praepubertal acceleration of growth in height, at first fully established by Bowditch and later on confirmed by Kotelmann, Roberts, Erismann and Porter, is also well shown in our tables.

According to Erismann, the period of accelerated growth, beginning with the advent of puberty and ending with the full establishment of sexual maturity, is completed at age 18.

We would add that a period of *retarded* growth follows immediately upon that of accelerated growth, after which period the curve again gradually makes a more rapid ascent towards the completion of the intended height. From age 20 growth is exceedingly slow. This fact is well illustrated in Table XII, in which, for the sake of comparison, I have added my own figures and those given by Porter to a table taken from Erismann.

In all the tables given here the ages have been calculated from the nearest birthday and not from the last birthday. The years, therefore, do not in all cases indicate the absolute age to which these figures belong, on account of the unequal distribution of the numbers within each year, that is to say, as the numbers between 15 and 16 years of age increase there must be a larger number of individuals between 15 and $15\frac{1}{2}$ years than between $14\frac{1}{2}$ and 15 years, so that the average age must be slightly higher than 15. The reverse must be the case, of course, when the numbers begin to decrease.

In connection with our averages and means, the measurements of Gould, taken during the war of secession, of a great many thousands of soldiers of different nationalities, are of some interest. The ages of the soldiers ranged between 31 and 34, years, a time of life when growth in height may most certainly be assumed to have been completed. They are classified as follows:

True Americans,	-	-	-	-	-	-	-	173.6 ci	n.
Southern States,	-	-	-	-	-	-	-	175.0 "	
British America,	-	-	-	-	-	-	-	173.0 "	
Englishmen, -	-	-	-	-	-	-	-	170.1 "	
Scottish,	-	-	-	-	-	-	-	171.3 "	
Irishmen,	-	-	-	-	-	-	-	171.1 "	
Germans,	-	-	-	-	-	-	-	169.6 ''	
French,	-	-	-	-	-	-	-	169.1 "	
Scandinavians, -	-	-	-	-	-	-	-	171.8 "	
Spaniards,	-	-	-	-	-	-	-	168.4 "	
Belgians,	-	-	_	-	_	_	-	168.6 "	

Erismann believes that these different nationalities would not have reached this average height in their own native country, and that the different conditions of environment peculiar to this country caused this discrepancy. Topinard puts the average height of Frenchmen at 165.9 cm., and Beddoe places the average height of Englishmen in their own home at 169 cm., while the mean height of Italians, according to Topinard, ranges between 161 and 166 cm.

Roberts, speaking of the most favored classes of English people, in which class he includes naval and military men and university students, puts their average at 175.26 cm.

It was mentioned in the beginning of this paper that Naval Cadets, being appointed from every part of this country, ought to give us as nearly as possible an average that might be considered *national* in character. Now, the average height, as found in our tables of Naval Cadets, is 174.29 cm. at the age of 23, and the mean height is 174.04. If we take the average of what Gould calls true Americans and Americans from the Southern States we obtain 174.30, which is within 1-100 of a centimeter the average height of our Naval Cadets. This agreement of these averages ought to go far in establishing the average height of Americans as at 174.3 cm. when fully developed and of the class which these records cover.

Examining our table of averages a little more closely we find:

1. Weight. In weight there is an almost steady increase from the 15th to the 23d year, amounting in all to 37 pounds, the annual increase declining, of course, as age advances.

2. *Height.*—The greatest addition to height standing takes place between 15 and 16 years of age, after which age the annual increase rapidly declines and growth is distinctly retarded about the 18th year, whence again a more marked increase occurs, which comes to a close at the age of 21; a third upward curve leads to the attainment of the final growth.

Height sitting practically comes to a close at 19 years of age.
 Height perineal, which is the height from the heel up to the perinaeum, closes at about the same age as the preceding.

5. *Circumference of chest* becomes highest at 19, to which it attains at rapidly advancing rates, and thence becomes steady or advancing only by small fractions of an inch.

6. *Lung capacity*, as ascertained by the spirometer, reaches its maximum at 19 and continues steady or varies only slightly.

7. Waist shows a continued increase up to the 23d year, remaining, however, stationary from 19 to 21, and after that continues to increase more rapidly.

8. Span of arms.—Its greatest increase takes place between 15 and 16 years of age; it then increases slowly but steadily until the 23d year.

9. Vision.—We notice here the significant fact that both right and left vision show a positive increase up to the 19th and 20th year. This fact seems of some importance in apparently demonstrating that the course of study at the naval school, and the strain that is necessarily put upon the organ of sight, does not in itself tend towards diminishing the degree of distance vision in an otherwise normally constituted eye, but that, on the contrary, it is rather advantageous in slightly but perceptibly increasing the visual range. The slight decrease in distant vision noticed at the 23d year would indicate to my mind and to those acquainted with life at sea and its requirements on those actively engaged in it, the result of undue strain.

10. *Hearing.*—As to hearing, it is perhaps equally significant that that organ is affected quite perceptibly, but in the contrary direction; we may notice here a gradual but steady decrease for both sides during the entire period under observation, and, no doubt, the occupation of Naval Cadets would lead us to expect just such a result.

11. Squeeze shows a steady increase, with but slight and unessential variations.

There exists some difference of opinion as regards the relation of the period of accelerated growth to puberty. If growth and procreation are, as they have been designated, antagonistic processes, we must agree with Bowditch, in that the period of accelerated growth is praepubertal in time. It would perhaps also follow quite naturally that the fullest establishment of maturity should be followed by a period of *retarded growth*, as is apparently shown in our figures of the annual growth. We do not find any great cause for controversy with regard to this question, nor do we consider it difficult to reconcile the opinions held by Bowditch on the one hand and by Pagliani and Carlier on the other. The beginning of the stage of puberty is not necessarily that of sexual maturity. Nature prepares the individual for sexual maturity and the process of procreation by inaugurating changes that are advantageous to the species and by causing increased development in various dimensions. This sudden wave of normal development completed, it results in sexual maturity becoming fully established and functional, and with its full establishment, growth in the different dimensions takes a short and much-needed rest, during which the organism at large sympathetically accommodates itself to the new order of things.

It is more than merely probable that the exact time of life when this praepubertal development begins is, within a certain limited range, different for every individual even of the same type and social class. In some it may come on a little sooner, in others a little later, so that these two phenomena must neutralize each other to a certain extent by this overlapping, and the probable result must be that the absolute praepubertal increase is actually larger than it is usually recorded.

Neither the average nor the mean gives us any information as regards the manner in which the individual measurements of a series are distributed, and it is clear that two series with an identical mean or average may yet differ largely in respect of the dispersion of the individuals from the middle value, as was shown above.

According to Boas, the mean deviation is the more accurate of the two, and which is no doubt true; but inasmuch as its relation to the probable deviation would be in all respects constant, and as it was one of our objects to make the results of our investigations comparable to those of previous investigators, the preference was given to the probable deviation.

Table VIII represents the probable deviations for the items that were available for calculation. It will be seen by this table that they are small, even when compared with those given in Porter's tables, which indicates that one-half of all the observations deviate but little from the middle values, and which fact is considered to be one of the fundamental attributes of all deviations due to accidental causes.

It is extremely doubtful from present appearances whether any further significance will ever be attached to the percentile grade system in the future than that of using it merely as a means for classifying anthropometric facts in percentages.

Boas, in his latest contribution to "Science," March, 1895,

states that if the assumption is made that the same children remain on the average in the same percentile grades, a certain very complex law must follow; for any different law of growth, children would change from one grade to another. And Porter remarks that in order to determine the relation of the growth of the individual to the growth of the type we must have material that admits of the application of the individualizing method, and that the present state of our knowledge of the subject does not permit us the prediction of future growth.

I believe that the prediction of future growth, even after having accumulated a sufficient amount of material which will permit of the application of the individualizing method, will always form a difficult if not doubtful task, for the reason that we are unable to predict, at the same time, the causes that will influence individual growth.

In the records at my disposal I find that their continuity is often broken by the omission of one or more items for one or more years in succession. This may be due to an oversight on the part of the examiner, or to a temporary inability on the part of the examinee to submit to that part of the examination. Hence if a very large number of such continuous individual records were required, even the material at my disposal would not be such as to definitely settle this question practically; and if I were to rely on broken records and put a larger number of these together and average them, I would simply arrive at about the same curves that are presented as the results of the whole number of observations. In fact, our averages and means and the deviations therefrom are the results of just such records, about 30 per cent of them being continuous and, with the exceptions mentioned, unbroken for the period of growth covered by them.

However, on searching these records I was able to find between 35 and 40 continuous records of individual cadets, each beginning with the 25th percentile grade in height as well as in weight, either at 15 or 16 years of age, and as many such as began with the 75th percentile grade in the same items and at the same ages. These, when examined individually and compared to the average progression of their respective percentile grades obtained from the whole number of observations that are recorded here, revealed the fact that not a single one of them remained in the grade to which it belonged.

The exact number of individual records belonging to the 25 percentile grade as to weight is 40, and that of those belonging to the 75th percentile grade is 36. As to height standing, there were 39 belonging to the 75th and 37 belonging to the 25th percentile grade.



Continuous lines: normal, 75, 50 and 25 per cent. Broken lines: individual, 75 and 25 per cent.

The averages of these records have been tabulated together with the 25th, 50th and 75th percentile grades obtained from the whole number of observations, viz. Table XIII.

The relation which these individual averages bear to the general averages is best seen in Figs. 2 and 3 plotted from the tables.

The 25th percentile individual curve of both height and weight shows a marked tendency to approach the 50th percentile grade curve or the mean of all the observations. As to height alone, the 75th percentile individual curve likewise, but not so directly as the 25th percentile curve, inclines toward the curve of the middle value. In both the height-curves there is, it would seem, a strong aim at the middle value towards the end of the period of growth.

The curves, shown in Fig. 2, and a detailed comparison of the individual records with the normal percentile grades of their class, would go far in convincing me of the fact that individuals do not necessarily remain in the percentile grades in which, at some time during their period of growth, they may happen to be found.



FIG. 3. Weight.—Percentile and Individual Curves Compared.

Continuous lines: normal, 75, 50 and 25 per cent. Broken lines: individual, 75 and 25 per cent.

As, however, this question seems to be one of the greatest importance, and inasmuch as a definite settlement of all doubts in regard to this matter would be looked upon as a positive advance of our ideas of growth, we have attempted to enter a little more into the details of the matter.

We began by making a somewhat larger collection of individual and continuous records. By allowing a broader limit than a certain percentile grade to begin with, we have succeeded in accumulating the data exhibited in the three Tables XIV, XV and XVI, and have divided them into three groups for reasons

which will become more apparent as we proceed. It was perhaps to be expected that growth for tall boys would be found to be different from what it is for short ones, and these tables seem to prove this suspicion to be absolutely correct. When the averages given in these three tables are compared it becomes very evident that there is a well characterized law of growth for each of the three groups, that is to say, it is seen that the short boys grow more rapidly than the tall boys and also more rapidly than middlesized boys during the period under consideration. Thus we find that the short boys grow 4.2 inches, the middle-sized ones 3.3 inches, and the tall ones only 2.0 inches during a period from 16 to 22 years of age. Previous conditions may perhaps often determine the growth that follows, and the smaller a boy at a certain age during the period of growth the greater will be his chances for growing during the years that follow, while tall boys are very much more apt to have their growth completed earlier than small boys are. Still it seems we cannot deny that present environments and causes also continue to exert an unmistakable influence on growth no matter what the preceding ones may have been.

In order to bring out the difference in the growth of the several groups still more clearly we have made certain selections from the larger tables between definite limits, and have calculated the averages and the probable deviations from different years. The selection was made at every year between the limits indicated on the tables, and then the number of individuals thus selected was carried straight through to the twenty-second year, as shown in Table XVII. It will be noticed by a glance at the table (XVII) that while the averages increase from beginning to end as well as from above downwards during the same years or in the direction from the lowest to highest average, the probable deviations increase only from year to year; but when read from above downwards they very rapidly decrease. In the tall group the averages increase but slightly from year to year in each group and from within the limits indicated; but when read from above downwards they tend to decrease in spite of the limits from which they were started growing steadily higher. The limit of this decrease, however, is soon reached and the averages increase correspondingly. The reason for this behavior in the averages is that the number of those that cease growing increases rapidly and consequently drop out of the succeeding series which contains naturally the tallest and the fewest.

The probable deviations always show a rapid increase between the first two years of every new series; they regularly decrease from above downwards and approach more nearly the average.



This increase in the probable deviation between the first two years or at the beginning of each series is, no doubt, due to the rapid scattering of the members in each series, and plainly shows that they do not retain the same relation to each other in the next series in which they were contained in the preceding series, and which is additional proof of the fact that *percentile grades do not control growth*.

The average values, showing the absolute annual increase, are not necessarily the most frequent values, as is well known, and consequently we must find out something of the individual growth and their numerical proportion and distribution which produce this average.

For this purpose we have calculated the individual growth between two successive years from our original Tables XIV, XV and XVI and tabulated the results represented in Table XVIII. This table of the individual absolute annual increases in height shows at once the distribution of growth, the most frequent

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values, and also, in a very striking manner, the number of those who cease to grow and at what age. The difference in the growth between tall and short boys is here brought out very strongly. The figures show as clearly as one could wish that tall boys are much more likely to have completed their growth at an earlier age than short boys, and also that short boys not only grow more rapidly and more extensively than tall boys, but also that they continue to grow up to a later age than do tall boys.

The rapidly increasing numbers at zero, to be seen on Table XVIII, prove conclusively that tall boys have completed their adult stage of development in height at an earlier age than short ones.



Probable Devratures compared.

In perfect agreement with this conclusion would seem to be the probable deviation as shown in Fig. 5. In small boys this deviation is seen to rise much higher than in tall ones.

Percentile Grades in Height Standing, Weight, Height Sitting, Perineal Height, Circumference of Chest, Lung Capacity, Span of Arms, Waist Measure, and Right and Left Hand Squeeze.

The percentile grades in these various dimensions are presented in Tables XIX-XXVIII, and those of height standing and weight are also graphically represented in Figs. 6 and 7 respectively. With the help of these tables and plates the percentile rank of any individual in any of the above-mentioned dimensions may be easily and quickly determined.

Supposing, for instance, the percentile rank of a cadet aged 17 years and weighing 134 pounds was desired. A horizontal line is drawn from 134 in the column of weights on the left of the plate to the curve of age 17, and a perpendicular is dropped from the



point of intersection to the scale of percentile grades at the bottom of the plate. The perpendicular falls at 75 per cent, and hence the cadet in question is heavier than 75 per cent of the cadets of his age and lighter than the remaining 25 per cent.

Likewise we may find the increase at any percentile grade dur-

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ing one or more years by measuring the distance between the curves at that grade and comparing that distance with the pound scale, which will give the number of pounds. In the same plate the gain in weight of the 50 percentile grade cadet during the years of 15 and 18 is 24 pounds, and the gain in weight of the 80th percentile grade cadet during the same period is found to be 25 pounds.



In a somewhat similar manner the percentile rank of any cadet at any age in any dimension included in our tables may be found by a reference to these tables. Their value, therefore, as an aid to the annual examiner of cadets may easily be estimated.

RATE OF GROWTH.

The ten tables XXIX-XXXVIII represent in percentile grades the absolute annual increase in the various dimensions as calculated from the whole number of observations and without regard to whether they are large or small. By absolute annual increase is meant the gain in height or weight during the preced-

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ing twelve months, obtained by subtracting the average or median height or weight at, for instance, 18 from that at 19 years.

On account of the unequal distribution of the numbers between the different years, the ages given in the column are not absolutely correct, but the error is so small that it may be neglected here.

It will be noticed that the rate of increase in the various dimensions differs considerably. The subject of the correlation of the different dimensions to one another at the different ages and in individuals of different statures is still to be determined. To settle this question we need a large number of individual records.



As regards weight, we notice a steady decrease in the annual amount of gain from the 15th to the 21st year, which decrease becomes most marked from the 19th year on upwards, and in the highest percentile grades is even negative.

Height once attained is not so easily lost, but weight is easily lost as well as quickly regained.

As to height, the greatest annual increase is noticed to take place between 15 and 16 years of age, the lowest between 18 and 19 years. In some of the highest percentile grades it apparently becomes slightly negative as it does in the weight tables; this is more especially shown between the 21st and 22d years, but also noticeable between the 20th and 21st years. The reason for this negative annual increase is well explained by our Tables XIV, XV and XVI, which show clearly that just about the 21st year our averages are less reliable than they are at other ages, and therefore our annual growth tables do not in the least render improbable the fact that height once attained is rarely if ever lost.

Weight and strength, on the other hand, are easily lost and rapidly regained, and any decrease in these may therefore be easily explained.

RELATIVE ANNUAL INCREASE.

The ten tables XXXIX-XLVIII represent in percentile grades the relative annual growth in the different dimensions under discussion. Relative annual increase means the increase for any year divided by the average at that year. Thus the relative annual increase in weight at age 18 is the difference between the average weight at 17 and 18 divided by the average weight at 17.

According to Porter (loc. cit.) the relative annual increase gives a truer idea of growth than does the absolute annual increase, because of the latter being entangled with the size of the individual measured. Porter also states that "the absolute annual increase is commonly greater in a big boy than in a small boy, and yet the rate of growth may be the same." This is no doubt true for that period of growth which is covered by the material worked out by him. For a later period, from 15 to 22 years, the rate of growth for big boys is both absolutely and relatively smaller than for short boys. This is not only well shown in our percentile height-curves on Fig. 6, plotted from the whole number of our observations, but also in our individual Tables XIV, XV and XVI, as well as in Fig. 4.

So far as weight is concerned these tables show the same gradual decrease in the annual rate as the height tables. This decrease is here most abruptly marked between 19 and 20, becoming negative with the 21st year.

TABLES XLIX-LVIII.

The material here presented would admit of still further elaboration. The dimensions of correlated parts and their ratios to one another ought to be worked out. The difficulty, however, that presents itself here is the same that was encountered in connection with the rate of growth and its difference between tall and short boys. The facts so far would indicate that, for instance, the ratio that exists between growth in height and chest girth is differ-



ent for short boys from what it is for tall boys. This work must be done on material admitting of the application of the individualizing method and separately for small, middle-sized and tall individuals, to be of value and conclusive.

The tables XLIX-LVIII, however, will prove useful, admitting, as they do, of ready reference and comparison and containing a great deal of information in a small space. ٠

APPENDIX.

on of the served of the served of the served and Ca- and Ca- and Sure and S	The ca Hand-Squ Cadets age	TABLE II. lculation of t eeze (right) o ed 17 years.	he Average f 225 Naval	The calculation of the average weight (17 years.	TABLE III. the Probable 1 125 lbs.) of 722	Deviation (d Naval Cadet) from s aged
he ob ributi Heig Nave aged	Strength in	Number of Observations.	Product (a)	Weight at intervals of five pounds.	No. observed.	δ Deviation.	пб
Heights at inter- divals of one inch. Number of B42 A4 Observations. de	50 55 60 65 70 75 80 85 90 95	2 3 15 18 30 43 40 34 20 11	100 165 900 1170 2100 3225 3200 2810 18c0 1045	195-205170-175165-170160-165155-160150-155145-150140-145135-140130-135125-130	2 2 6 11 19 24 51 59 85 97	75 50 45 30 25 20 15 10 5	75 100 90 240 385 570 600 1020 885 850 485
74-75 72-73 72-73 72-73 71-72 80 69-70 118 68-69 135 67-68 146 66-67 135 65-66 94	$A = \frac{\sum_{n=1}^{100} A_n}{n}$	$63aln = 225= \frac{1743^{\circ}}{225} = 75.4$	$\frac{600}{315}$ $\Sigma a = 17430$ 6 pounds.	$\begin{array}{c} 120-125 \\ 115-120 \\ 110-115 \\ 105-110 \\ 100-105 \\ 95-100 \\ 00-95 \\ 85-90 \\ 85-90 \\ 80-85 \end{array}$	97 82 71 61 35 7 9 2 1 722	0 5 10 15 20 25 30 35 40	410 710 915 700 175 270 70 40 8490
64-65 38 63-64 15 62-63 8 61-62 3 60-61 59-60 1 Total842				<i>d</i> =±0	$0.8453 \frac{8490}{722} = \pm$	= 9.94.	

	LABLE	1 V.		1	I TVPLR	V 1.
The theor 722 Naval Ca	etical and observed of adets aged 17 years.	the Heights of	Stieda's Table for calculating	The percer bution of th	ntile distri- ne Heights	
Probable Deviation.	Height at intervals of $\pm 0.5d$.	Theoretical Distribution.	Observed Distribution.	observations at	of 841 Nava aged 18 year	I Cadets
+ 5.0 5 ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	75.00 74.20 73.40 72.60 71.80 71.03 70.20 68.60 67.80 67.80 67.80 67.80 67.80 67.80 67.80 64.60 65.40 64.60 63.80	1 2 4 9 17 30 48 69 87 94 94 69 69 48	1 2 5 11 8 32 46 70 90 91 91 99 94 72 48	From the mean or average within the limits: $M + \frac{1}{5d}$ and $M - \frac{5d}{5d}$. $p = \frac{1}{5d}$, $p = \frac{1}{5d}$	Ing to this in Percentile Grades. 5 10 20 30 40 50 60 70 80 90 95	Heights. 64.56 65.00 65.00 67.01 67.66 68.54 69.00 69.58 70.55 71.52
- 2.5 " - 3.0 " - 3.5 " - 4.0 '' - 4.5 "	62.97 62.20 61.40 60.60 59.80 59.00	30 17 9 4 2 1 otal722	14 16 5 2 1 722	1.1 54.2 2.8 94.1 1.2 58.2 2.9 95.0 1.3 61.9 3.0 95 7 1.4 65.5 3 5 98.2 1.5 68.8 4.0 99.3 1.6 71 94.5 99.8 1.7 74.8 5.0 99.93		

e

	TABLE VII.											
	Probable Error of Average: $E = \pm \frac{d}{\sqrt{n}}$, where $\epsilon = \text{probable error}$. d = probable deviation. n = number of observation											
Dimensions	Unit of Age at nearest Birthday and Probable Error.											
Dimensions.	Measurement.	surement. 15 16 17 18 19 20 21 22										
Weight, (nude)	pounds.	0.922	0.531	0.370	0.400	0.360	0.371	0.456	0.500	0 768		
Height, standing	inches.	0.136	0.020	0.059	0.057	0.054	0.060	0.071	0.086	0.099		
Height, sitting	inches.	0.088	0.048	0.032	0.027	0.035	0.027	0.024	0.040	0.036		
Height, perineal	inches.	0.131	0.054	0.045	0.040	0.031	0.038	0.070	0.062	0.073		
Chest circumference	inches.	0.123	0.066	0.044	0.013	0.038	0.048	0.052	0.065	0.079		
Lung capacity	cb. inches.	2.306	1.091	0.820	0.732	0.642	0.834	0.940	1.150	1.125		
Waist circumference	inches.	0.095	0.052	0.042	0.044	0.044	0.052	0.062	0.070	0.093		
Span of Arms	inches.	0.130	0.091	0.054	0.060	0.062	0.072	0.076	0.108	0.093		
Vision, R. E	feet.	0,270		0.103	0.108	0.120	0.163	0.163	0.163	0.243		
Vision, L. E	feet.	0.231	0.132	0.111	0.108	0.115	0.133	0.127	0.172	0.233		
Hearing, R. Ear	feet.	-	0.069	0.050	0.038	0.054	0,100	0.076	0.247	0.238		
Hearing, L. Ear	feet.		-	0.036	0.036	0.027	0.073	0.110	0.210	0.234		
Squeeze, R. H	pounds. 0.800 0.367 0.273 0.245 0.274 0.316 0.365 0.449 0.421											
Squeeze, L. H	pounds. 0.800 0.307 0.273 0.245 0.274 0.310 0.305 0.449 0.42 pounds. 0.790 0.367 0.274 0.250 0.273 0.322 0.327 0.463 0.460											

TABLE VIII.

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TABLE VIII. δ = Deviation of average.Probable Deviation (d) from the average: $d = \pm 0.8453 \frac{\Sigma}{n}$, where $\Sigma \delta$ = Sum of individual deviations.n = Total number of observations.

Dimensione	Unit of	Age at nearest Birthday and Probable Deviation.								
Dimensions.	Measure.	15	16	17	18	19	20	21	22	23
Weight	kilos.	4.808	4.790	4.508	5.116	4.472	4.277	4.599	4.114	5.357
	c. m.	4.07	2.06	4.02	1.20	2.81	2.81	4.01	3.06	2.82
Height, standing	inches.	1.96	1.56	1.59	1.68	1.50	1.50	1.58	1.56	1.51
** * * * *	c. m.	2.56	2.43	2.18	2.05	2.49	1.77	1.37	1.88	1.44
Height, sitting	inches.	1.01	0.96	0.86	0.81	0.98	0.70	0.54	0.74	0.57
Height, perineal	c. m. inches.	3.83	3.27	3.17	3.09	0.86	0.98	4.24	2.89	2.84
Circumference Chest.	c.m.	3.60	3.37	3.12	3.20	2.64	3.0)	2.94	2.99	3.04
energia energia	ch. c. m.	127.	2:5.	260.	272.	220.	276.	220.	2 20.	312.
Lung capacity	cb, inches.	26.1	21.69	22.0	22.87	19.6	21.19	20.84	20.83	19.05
Circumference Waist	c. m.	2.76	2.61	2.87	3.30	3.07	3.37	3.50	3.25 1.28	3.60
	c.m.	2.00	4.50	4.41	4.44	4.36	4.60	4.26	5.02	3.60
Span of Arms	inches.	1.18	1.81	1.74	1.75	1.72	1.85	1.68	1.98	1.42
Wister D. F	meter.	•917	.183	.847	.956	1.002	1.261	1.106	·927	1.130
vision, R. E	leet.	3.09	0.0	2.78	3.14	3.29	4.14	3.03	2.95	3.71
Vision, L. E	feet.	2.66	2.62	3.0	3.12	3.21	2.38	2.81	3.12	3.55
	meter.		.420	.411	.515	.463	.771	.515	1.365	1.106
Hearing, R. Ear	feet.	0.0	1.38	1.35	1.69	1.52	2.53	1.69	4.48	3.63
Hearing I Fee	meter.			.298	· 317	.231	. 564	•74I	1.161	1,181
meaning, L. Ear	reet.	0.0	0.0	0.98	1.04	0.75	1.85	2.43	3.81	3.00
Squeeze, R. H.	nounds	4.130	3.311	3.325	3.225	3.411	3.013	3.079	3.081	6.42
	kilos.	4.136	3.316	2.350	2.272	2.270	2.715	3.202	3.810	3.220
Squeeze, L. H	pounds.	9.05	7.31	7.43	7.22	7.43	8.19	7.26	8.40	7.10

TABLE IX. Values of the Averages in the following dimensions.

-	_														
Age at nearest Birthday.	No. of Observations.	Weight in kilos., pounds.	Height, standing, c.m., inches.	Height, sitting, c.m., inches.	Height, perineal, c.m., inches.	Circumference of Chest, c.m., inches.	Lung capacity, litres, cb. inch.	Waist, c.m., inches.	Span of Arms, c.m., inches.	Vision, R. E. metres, feet.	Vision, L. E. metres, feet.	Hearing, R. Ear. metres, feet.	Hcaring, L. Ear. metres, feet.	Squ R. H. kilos, lbs.	eeze. L. H. kilos lbs.
		48.53	162.052	84.58	81.28	77.47	2.008	63.75	162.30	7.314	7.314	12.192	12.192	27.66	27.21
15	132	107.	63.8	33.3	32.0	30.5	183	25.09	63.9	24.0	24.0	40.0	40.0	61.0	60.
		53.01	167.456	86.48	83.82	80.51	3.293	66.04	170.94	7.332	7.559	11.978	12.192	32.43	31.75
16	395	118.	65.93	34.5	33.2	31.67	201	26.0	67.33	24.6	24.8	39.3	40.0	71.5	70.
1.00		50.70	170.30	88.90	86.36	82.55	3.555	69.59	172.72	7.742	7.620	11.887	12.009	35.127	34.74
14	722	125.	67.05	35.0	34.0	32.5	217	27.30	68.0	25.4	25.0	39.0	39.4	77.47	70.0
10	0	00.55	170.710	90.7)	87.30	85.00	3.702	70.80	175.84	7.711	7.528	11.820	11 978	30.74	30,28
19	04I	133.4	07.29	35.75	34.0	33.40	220	27.9	00.25	25.3	24.7	33.8	39.3	0.15	05.
10	700	120 7	172.400	91.50	91.0	88.90	3.932	72.01	170.05	7.711	7.001	11.007	12.039	30.55	37.04
10	750	61.05	17.90	30.50	58.00	35.0	2.10	72 61	178 05	25.3	25.24	39.0	17 826	20.46	28 55
20	645	141.2	68.55	25.77	25.0	24.2	3.9.5	28.62	70.1	24 1	26.0	28.2	28.8	87.0	85.
	043	63.40	174.224	01.44	86.26	87.12	2.018	72.80	170.83	7.437	7.620	11.887	11.582	30.01	30.64
2I	403	140.	68.6	36.0	34.0	34.3	241	28.68	70.67	24.38	25.0	30.0	38.0	88.0	87.4
	155	64.00	173.863	QI.44	88.90	87.20	4.030	73.15	178.30	7.498	7.405	11.217	11.338	39.23	38.91
22	328	141.3	68.45	36.0	35.0	34.35	246	28.8	70.2	24.6	24.34	36.8	37.2	86.5	85.8
		65.31	174.294	91.44	83.00	88.39	3.964	74.16	180.34	6.888	7.010	11.427	11.368	39.28	38.42
23	232	144.0	68.62	36.0	35.0	34.8	242	20.2	71.0	22.6	23.0	37.5	37.3	86.6	84.7

Age at nearest Birthday.	No. of Observations.	Weight.	Height, standing.	Height, sitting.	Height, perineal.	Circumference of Chest.	Lung capacity.	Waist Circumference.	Span of Arms.	Squeeze, R. H.	Squeeze, L. H.
		49.216	163.29		84.12	76.07	2.920	63.70	163.83	27.21	25.58
15	131	108.5	64.290		33.125	29.952	178.2	25.12	64.50	60.0	56.4
10		53.025	107.13	85.34	05.92	70.99	3.170	05.45	109.07	30.04	29.40
10	395	110.9	170 18	33.500 86.81	87.88	81.25	193.5	67.18	172.46	24.10	22.22
17	722	124.8	67.000	24.180	34.600	31.805	208.8	26.45	67.00	75.2	73.5
1.	,	59.780	171.78	87.96	88.90	83.00	3.588	69.13	174.11	35.14	34.01
18	841	131.8	67.633	34.630	35.007	32.685	219.0	27.22	68.55	77.5	75.0
		62.14	171.83	89.07	89.50	84.45	3.736	70.10	175.33	37.19	36.96
19	750	137.0	67.651	35.055	35.243	33.250	228.3	27.60	69.03	82.0	81.5
	· · · ·	62.823	173.35	89.53	89.68	85.29	3.818	71.00	170.27	38.00	37.19
20	045	138.5	08.252	35.254	30 310	33.500	233.2	27.98	09.40	83.8	02.0
21	102	128 0	68 215	90.01	25 210	22 656	212.2	27.60	60.02	30.91	30.32
~1	493	62.014	172.60	33·493 80.71	00.14	85.77	2.882	70.62	176.78	28.55	38.00
22	328	138.7	68.352	35.320	35.492	33.776	237.9	27.81	69.60	85.0	83.8
		62 732	174.04	89.73	90.55	86.28	3.872	70.84	174.62	40.37	38.55
23	232	138.3	68.522	35.333	35.654	33.873	236.3	27.89	69.93	89.0	85.0

TABLE X. Median Values in same dimensions as Table IX.

TABLE XI. Median minus Average Values.

					8						
Dimensions	Unit of Maccure	it of Ages at nearest Birthday and Median minus Average Values.									
Dimensions.	ment.	15	16	17	18	19	20	21	22	23	
Weight	pounds.	+ 1.5	- 1.1	- 0.2	- 1.5	- 2.7	- 2.7	- 1.1	- 2.6	- 5.7	
Height, standing	inches.	+ 0.490	- 0.125	- 0.05	+ 0.343	- 0.249	- 0.298	— 0.385	- 0.098	- 0.098	
Height, sitting	inches.		- 1.000	- o.820	- 1.120	- I.445	- 0.516	- 0.555	- 0.680	- 0.667	
Height, perineal	inches.	+ 1.125	+ 0.630	+ 0.600	+ 0.407	- 0.657	+ 0.310	+ 1.340	+ 0.492	+ 0.645	
Chest circumference	cb. inches.	- 0.548	- 0.569	— 0.605	- 0.775	- 1.756	- 0.712	- 0.644	- 0.574	- 0.927	
Lung capacity	cb. inches.	- 4.8	- 7.5	- 8.2	- 7.0	- 11.7	- 5.8	- 8.8	- 8.1	- 5.7	
Waist circumference	inches.	+ 0.03	- 0.23	- 0.97	- 0.68	- 1.00	- 0.64	- 0.99	- 0.99	- 1.31	
Span of Arms	inches.	+ 0.60	- 0.53	- 0.10	- 0.70	- 1.09	- 0.70	- 0.74	- 0.60	- 1.07	
Squeeze, R. H	pounds.	- 1.0	- 3.5	- 2.27	- 3.5	- 3.0	- 3.2	- 2.2	- I.5	+ 2.4	
Squeeze, L. H	pounds.	- 3.6	I- 5.0	- 3.1	- 5.0	I- I.5	- 3.0	- 2.9	- 2.0	+ 0.3	

TABLE XII. Showing Annual Growth of different Nationalities.

Agas	Beyer,	Bowditch,	Kotelmann,	Roberts,	Erismann,	Porter,						
ages.	c. m.	c. m.	c. m.	c. m.	c. m.	c. m.						
13-14 14-15 15-16 16-17 17-18 18-19 19-20 20-21	2.54 5.41 2.84 0.60 1.54 1.90 .12	6.80 6.10 6.90 2.10 1.60 1.40	5.79 5.31 7.46 5.25 1.49	5.4 5.1 5.6 6.7 3.9 1.9 1.8	3.48 5.45 6.53 5.38 3.19 1.80 0.80	Av. Mean. 5.67 5.57 6.32 6.39 5.37 6.02 4.86 4.73 5.28 4.50						
22-23	.43	1	1									

TABLE XIII. Comparison of Normal * with Individual Records.

i.—neight.								
Parcantile Crades		Ag	es at ne	earest	Birthda	.y.		
reicentile Grades.	15	16	17	18	19	20	21†	
Normal 75	66.20	67.61	68.70	69.29	69.51	69.86	69.83	
Individual75	66.10	67.45	68.25	68.76	69.10	69.15	69.80	
Normal	64.29	65.85	67.00	67.63	67.65	68.25	68.21	
Individual25	62.20	64.44	65.62	66.70	66.65	67.62	68.07	
Normal25	62.05	64.14	65.50	66.18	66.54	66.75	68.74	
		IIV	Veight.					
Individual75	117.0	129.3	138.0	144.0	148.0	150.0	152.0	
Normal75	118.5	127.8	135.0	143.0	147.5	149.6	149.9	
Normal50	103.5	116.9	124.8	131.8	137.0	138.5	138.9	
Individual25	95.5	107.5	122.0	130.0	130.3	137.0	134.4	
Normal 25	95.9	106,2	114.4	121.9	127.1	128.	129.3	

* Number smaller than under the preceding years, especially in individual 75 percentile grade, and therefore this grade is not plotted.

† Refers to the averages derived from the whole number of observations, expressed here in percentile grades.

Inches at the following years.															
No.	16	17	18	19	20	21	22	No.	16	17	18	19	20	21	22
1	68.4	70.0	70.5	71.0	71.1		71.0	34	68.3	69.5	70.7	71.1	71.2		71.2
2	68.0	69.3	69.5	69.5	69.5		69.6	35	69.2	69.3	69.7	70.2	70.4		70.4
3	67.4	68.0	68.6	68.3	68.3		68.3	36	68.0	68.5	69.0	69.0	69.0		69.I
4	69.0	69.7	70.4	70.4	70.5		70.5	37	67.0			72.4	73.4	73.4	73.2
5	68.0	68.5	68.7	69.3	69.4			38	68.5	69.2	69.2	69.4	69.7	70.0	70.1
6	67.4	68.0	68.2	68.3	68.3		68.5	- 39	68.0	69.5	71.0	72.0	72.1		
7	68.2	68.6	68.7	69.0	69.1		69.1	40	67.4	68.1	68.4	68.4	68.6		68.6
8	68.5	69 2	69.3	69.5		69.7		41	68.6	70.3	70.5	71.4	72.2		.72.4
-9	68.5	69.2	69.4	69.2	69.2		69.5	42	68.5	69.4	69.4	69.4	69.6		70.0
10	67.2	67.6	68.0	68.0	68.I		68.0	43	68.2	69.2	69.5	70.0	70.2		70.4
11	67.2	67.2	67.5	68.0				44	68.0	69 4	69.7	70.2	70.4		70.2
12	68.0	68.6	69.0	69.1	69.2		69.3	45	67.6	69.2	70.3	70.6	70.4		70.7
13		68.0	68.4	68.6	68.7	68.7	68.7	46	67.0	67.2	68.0	68.0	68.1		68.0
14		66.7	67.1	67.4	67.4	67.4	67.4	47	69.0	70.3	70.4	70.4	70.4		70.6
15	07.2	68.3	69.3	69.5	69.6	70.1	70.2	48	68.4	69.I	69.6	69.7	69.6		69.6
16	08.2	68.6	69.0	09.2	69.4		69.4	49	67.5	68.2	68.2	68.6	68.7	i	69.0
10	09.0	70.2	71.0	71.3	71.5		71.4	50	68.3	09 2	70.0	70.0	70.5		71.0
18	68.7	09.3	09.7	09.7	69.7		69.7	51	68.0	69.0	70.0	70.0	70.3		70.2
19	07.2	00.1	08.1	08.3	08.2		08.4	52	07.5	07.0	68.2	08.2	08.5		10
20	60 6	07.0	07.2	07.5	67.7		67.0	53	67.1	07.0	67.0	07.0	07.7		68.4
21	60.0	09.4	09.4	70.0	70.1		70.1	54	07.4	08.2	08.7	09.4	09.4		09.0
02	69.0	69.2	69.2	69.2	09.2		09.2	00	07.0	08.3	09.2	09.3	09.0		09.0
20	07.0	66.0	60.5	08.7	09.0		09.1	50	07.0	07.4	07.7	60.1	60 .		60.1
95	68 0	60.3	09.4	70.1	70.4	70.4	70.5	21	07.2	67.0	07.7	08.1	00.4		03.4
26	67.7	68 -	68 0	69 2		<u> </u>	71.4	50	68.2	69.2	69.0	70.0	70.2		70.2
27	60.1	00.1	00.2	00.3		00.4	6	09	67.2	49 -	69.1	69.7	69.7		70.2
28	67.4	68	68 4	60.0	71.5		71.0	60	08.0	69.0	69.3	69.3	69.0		10.0
20	68 0	60.4	03.4	09.0	09.4		70.0	01	67.2	60.3	09.0	09.3	09.3		09.4
20	60.0	60.0	60.0	60.0	60.		60.4	0ŵ 69	69.0	09.0	70.3	70 3	70.0		70.0
31	67.0	68 2	68 7	60.0	60.1		60.7	00	00.0		10.00	/1.2	71.2	11.2	11.9
32	67.0	68.0	68.6	68.6	60.0		60.2	Anda	(0 -	<i>(</i> 0 -	60.0	60.0	60.9		-
33	67.2	67.4	68.0	68.6	68.6		68.6	AVS		08.7	09.2	09.5	09.8		70.0
00	-/.~	-/.4					00.0	- 0 -	= 0.40	0.02	0.00	0.70	0.70		0.75

TABLE XIV. Individual and Continuous Measurements in Height, Standing. Tallest Group.

Fractions in columns are eighths; the averages and deviation represented in inches and tenths.

 TABLE XV. Individual and Continuous Measurements in Height, Standing.	Middle-sized Group.	
Test so state Cilleria social		

Inches at the following years.															
No.	16	17	18	19	20	21	22	No.	16	17	18	19	20	21	22
1	65.4	66.1	66.7	67.1	67.2			38	65.9	65.2	65.4	65.4	65.4		65.4
2	66.0	67.0	67.3	67.6	67.5	67.5		39	65.3	65.7	66.2	66.2	66.2		66.4
3	66.0	68.4	70.7	72.0	72.5	-7.5	72.5	40	65.4	67.1	67.4	68.0	68.0		68.0
4		66.4	66.6	66.6	66.6	66.6	67.0	41	65.1	67.0	67.4	67.4			
5	66.0	67.0	67.4	67.4	68.		68.1	42	66.7	67.2	67.2	67.2	67.5		
6		67.0	67.2	67.2	67.5	67.6	67.6	43	65.5	66.5	67.2	67.2		67.3	
7		65.1	65.4	65.7	65.7	65.5	·	44	65.4	67.0	67.6	68.0	68.4		68.4
8	65.6	68.1	69.0	69.7	69.7			45	65.4	67.0	67.4	6 8.1	68.5		68.5
9		66.2	67.1	68.2	68 .6	68.7	68.6	46	65.2	66.2	67.2	67.2	67.5		
10		66.2	67.I	68.2	68.6	68.7	68.6	47	65.1	66.0	66.2	66.3	66.4		66.5
11	65.3	66.2	66.5	66.6	67.0	67.0		48	65.4	67.0	69.0	69.5	69.7		69.6
12	65.5	66.3	66.5	66.5	66.6		66.6	49	66.0	67.3	68.7	69.6	69.7	. 1	69.6
13	66.2	67.5	68.2	68.5	68.2		68.5	50	65.4	68.4	69.0	69.3	69.4	00.4	69.4
14		65.2	65.5	65.6	65.7	65.7	65.7	51	66.2	66.4	67.3	67.3		67.4	
10	65.0	66.0	66.2	66.3	66.3		66.3	52	66.2	66.4	67.4	07.4	07.4		6
16	00.0	67.0	67.2	67.6	67.7		677	53	66.6	68.2	68+4	69.0	69.0		09.0
17	60.5	67.4	68.2	68.2	68.6			24	66.5	67.1	67.1	07.1	07.1	6- 1	07.4
18	05.1	05.7	66.4	00.4	66.4		66.4	55	05.3	66.4	67.0	07.3	07.4	07.4	07.5
20	66.0	05.0	66.6	00.0	66.6		66.0	56	05.0	67.0	07.4	08.0	00.2	67.0	65.0
- 21	66	00.4	00.0	60.0	66.6		00.0	21	05.2	05.0	6.0	69 -	60.7	07.0	68
- 20	66 4	67.0	07.5	60.0	08.0		08.0	00	6- 0	66 4	67.7	68 0	68 0		68 r
92	66 0	68 0	07.3	07.5	07.4		07.4	08	05.3	6- 0	67.2	67.0	67.0		67.3
21	66 1	67.0	68 7	69.0	09.0		69.0	61	66 6	67.3	68 -	68	68 7		60.
25	66 7	66 .	60.1	69.0	69.0		69.0	69	66 4	68 0	60.9	60.5			70.4
26	60.1	60.3	65.4	6- 4	67.0		67.2	82	67.9	66 0	67.0	67.0	67.2		67.2
27	66.2	67.2	67 6	67.4	05.5	69.0	07.5	64	65.2	67.0	68.0	68.2	68.2		68.4
28	65.2	65.5	66.5	67.0	67 6	07.5		65	65.6	66.4	66.6	66.7	00.3	66.7	
29	0] . 2	65.0	66.4	67.2	67.2	67.5	67 5	66	65.4	0014	67.0	67.0	67.2		67.2
30	66.1	67.5	68.6	68.7	63.7	07.5	60.0	67	65.6	65.6	65.6	66.2	66.0		66.2
31	65.2	65.5	66.5	67.0	67.6		0,11	68	65.0	67.0	67.5	68.0	68.0	68.0	68.2
32	65.0	66 4	67.2	67.3	67.5		67.5	69	66.4	67.2	68.3	68.7	69.2	69.4	69.4
- 33	66.7	67.5	68.6	68.7	68.7		69.0	70	65.5	66.2	67.1	67.0		67.2	
34		66.0	68.0	63.4	68.6	69.	69.4	71	65.3	66.7	67.6	68.2	68.3	68.6	68.6
35		66.6	68.0	68.4	63.4	-	70.0		0.0	· · · ·					
- 36	65.2	66.0	67.0	67.0	67.3		67.3	Av's	65.7	66.7	67.4	67.7	67.9		63.0
37	66.1	67.7	69.2	70.0	70.2			$\pm d =$	=0.32	0.54	0.55	0.77	0.86		0.90

TABLE XVI. Individual Continuous Measurements in Height, Standing. Short Group.

	Inches at the following years.														
No.	16	17	18	19	20	21	22	No.	16	17	18	19	20	21	22
No. 1 2 3 4 5 6 7 8 9 10	16 62.½ 63.7 64.4 64.4 63.7 64.2 63.0 64.0 64.0 64.6	17 65.0 65.2 65.3 67.2 65.2 67.1 64.0 66.2 65.0 65.7	18 67.6 67.0 65.7 67.6 66.2 68.6 64.4 68.5 65.4 65.4 66.6	19 69.5 67.7 66.1 68.2 66.5 69.5 65.0 70.0 66.0 67.3	20 70.2 68.2 66.2 68.3 66.6 69.5 65.2 70.4 66.2 67.4	21	22 70.6 68.2 66.2 68.4 66.7 70.1 65.4 67.4 67.4	No. 28 29 30 31 32 33 34 35 36 37	16 60.4 62.6 63.2 62.4 64.2 62.2 63.0 62.1 64.0 62.7 6.0	17 63.5 64.4 64.5 65.2 64.6 64.5 65.2	18 64.2 64.4 65.7 66.6 66.5 65.2 66.0 65.6 65.3 65.3 66.4	19 65.2 65.0 66.2 67.2 67.4 65.2 66.3 66.1 65.4 65.6 65.6	20 66.7 66.5 67.4 67.7 65.6 66.6 66.4 66.0	2] 67.0 67.0	22 67.0 66.5 67.5 68.0 66.0 67.0 66.0
$ \begin{array}{c} 11\\ 12\\ 13\\ 14\\ 15\\ 16\\ 17\\ 18\\ 19\\ 20\\ 21\\ \end{array} $	63.2 64.0 64.1 63.7 64.4 64.4 64.3 61.0 61.3 63.6 63.2	65.0 65.6 65.6 64.3 66.4 65.1 65.6 62.7 63.5 64.5 65.6	66.7 67.5 67.5 64.3 67.6 65.3 66.6 64.4 65.0 65.0 65.7 65.7	67.5 68.2 68.2 64.7 68.1 65.6 67.1 65.2 65.5 65.5 65.7 65.7	68.0 68.5 68.5 64.7 63.4 66.1 67.1 65.6 65.3	66 .0	68.1 68.4 68.4 64.6 68.4 66.4 66.3 65.7 65.7	38 39 40 41 42 43 44 45 46 47 46 47 48	61.0 65.1 63.0 64.2 62.5 64.0 62.0 63.5 64.5 61.0 62.2	62.1 67.7 64.2 65.0 65.4 66.1 63.3 65.2 64.5 63.0 65.2	65.0 69.1 65.2 66.0 68.4 67.2 64.5 66.6 64.7 65.0 67.0	67.3 69.5 65.3 66.4 69.7 68.0 65.2 67.4 64.7 65.6 67.4	68.5 65.6 66.3 69.7 65.2 67.6 65.1 66.0 67.7	69 .7 67.6	69.1 66. 66.6 7°.5 65.3 67.6 65.2 66.0 68.0
22 23 24 25 26 27	03.2 64.3 61.2 64.0 63.2 63.4	05.4 65.6 63.0 65.5 64.2	66.6 66.6 67.0 64.7 67.7	67.1 68.0 67.1 64.5 68.1	67.3 69.0 64.6 68.1	69.6 67.1 64.7	70+4 65.1 68.6	$\begin{vmatrix} 49\\50\\51\\52\\\overline{Av'}\\+d \end{vmatrix}$	63.0 63.1 62.4 563.3	65.2 64.4 66.2 65.3 65.0 0.61	68.0 67.0 66.6 66.3	69.0 68.0 68.5 67.0	69.3 68.3 69.2 67.3	68.2	69.4 68.6 69.6 67.5

 TABLE XVII.

 Averages and Probable Deviations calculated from certain limited measurements and from different years.

 a. Small Group.

Inches.		16 years.	17 years.	18 years.	19 years.	20 years.	22 years.						
63.5-64.7"	at	64.0 ± 0.2	65.6 ± 0.6	66.7 ± 0.8	67.2 ± 1.0	67.3±1.1	67.4 ± 1.0						
65.0 - 66.5	at		65.6 ± 0.4	67. ±0.0	67.4 ± 0.8	67.6 ± 0.7	07.0 ± 0.6						
66.0 - 67.5"	at			67.0 ± 0.4	67·4±0·4	67.6 ± 0.5	68.0 ± 0.5						
67.0 - 68.5"	at				67.5 ± 0.35	68.0 ± 0.45	68.1 ± 0.45						
68.0 - 69.5"	at					68.5 ± 0.3	68.7±0.40						
68.5 - 70.I	1		1				69.3 ± 0.42						
			Ь.	Tall Group.									
67.0 - 69."	at	68.0 ± 0.49	68.7 ± 0.62	69.2±0.68	60.5 ± 0.76	69.8±0.79	70.0 ± 0.75						
67.5-69.5	at		68.4 ± 0.56	69.2 ± 0.64	69.4 ± 0.74	69.6 ± 0.67	69.7 ± 0.62						
68 70.	at			69.3±0.49	69.2 ± 0.56	69.4 ± 0.55	69.7 ± 0.54						
68.5 - 70.5	at				69.4 ± 0.40	69.6 ± 0.42	69.7 ± 0.44						
69.0 - 71.0	at					69.7 ± 0.40	69.8 + 0.42						
69.5 - 71.0	at			l			70.0 + 0.26						

TABLE	XVII	I.
 1 T.,		TT.T.L.

T

	a. Short Group. b. Tall Group.														
T -1			Years.		1		Years.								
Inches.	16-17	17-18	18-19	19-20	20-22	16-17	17-18	18-19	19-20	20-22					
•6		1.													
• 5		_				1									
•4		I.		1											
• 3															
.2	Ι. T.														
3	I.	т.							ļ						
.7	3.	I.				8									
.6	2.	г.			1										
•5	Ι.														
• 4	2.														
•3	I.	Ι.	1.			Į.		1							
.2	4.			1		1			6						
.1	2.						ļ		1						
2	2.	1.	2				1	1							
•7	2	3.	2.							1					
.5	2.	2.		т.		2.			1						
.3	2.	. I.			т.	3.									
.3	5.	4.	2.			1 3.									
.2	2.	4.	I.		г.	4.	x.								
. I	3.	2.	1.			3.	2.	1							
I	3.	6.	3.	г.		7.	2.	1.	Ι.						
•7	.3.	4.	3.	г.		4.	2.	Ι.							
•6	1.	3.	5.		I.	4.	8.	2.	Ι.						
•5	2.	Ι.	5.	2.	1.	11.	5.	2.	2.	2.					
•4	1.	4.	8	3.	0.	0.	10.	5.	1.	2.					
• 3		2.	2.	15.	4.		7.	10.	10.	4.					
+		T.	4.	7.	13.	4.	10.	6.	16.	8.					
0	I.	1.	5.	6.	8.	2.	4.	21.	13.	10.					
— .I				I.	3.	1			2.	8.					
.2		1	Ι.						I.	2.					
Total No	. 48.	48.	52.	45.	42.	57.	60.	бі.	57.	54.					

.

Age at nearest	No. of		Values in Inches at the following Percentile Grades.											
Birthday.	observations.	5	10	20	30	40	50	60	70	80	90	95		
15	131	59.507	60.310	61.563	62.553	63.457	64.290	64.855	65.764	66.653	67.717	69.290		
16	395	61.750	62.549	63.714	64.580	65.250	65.805	66.455	67.200	68.020	69.000	70.406		
17	722	63.130	64.217	65.165	65.853	66.434	67.000	67.626	68.317	69.100	70.320	71.320		
18	84 1	64.193	65.000	65.886	66.483	67.044	67.633	68.251	68.920	69.665	70.520	71.530		
19	750	64.680	65.391	66.250	66.844	67.424	67.651	68.600	69.243	69.786	71.000	71.880		
20	645	64 962	65.543	66.413	67.094	67.675	68.252	68.810	69.477	70.253	71.280	72.120		
21	493	64.970	65.620	66.433	67.054	67.667	68.215	68.852	69.483	70.180	71.120	72.000		
22	328	64.945	65.831	66.580	67.200	67.762	68.352	68.960	69.927	70.632	71.543	72.258		
23	232	65.287	65.800	66.580	67.300	68.010	68.522	69.030	69.625	70.307	71.240	72.000		

TABLE XIX. The Height.

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TABLE XX. The Weight.

Age at nearest	No. of		Values in Pounds at the following Percentile Grades.											
Birthday.	observations.	5	10	20	30	40	50	60	70	80	90	95		
15	131	0.03	85.3	93.0	98.8	103.8	108.5	112.6	116.5	120.5	127.3	132.0		
16	395	94.0	98.6	103.6	108.9	114.2	116.9	121.4	125.4	130.5	137.1	146.2		
17	722	102.4	106.5	112.0	116.9	121.0	124.8	128.5	132.5	137.5	144.3	151.6		
18	841	109.2	113.3	120.0	123.9	127.9	131.8	135.9	140.0	146.0	153.6	158.0		
19	7,50	114.3	120.0	124.8	129.5	133.3	137.0	142.1	145.3	149.7	158.0	165.1		
20	645	116.0	125.2	126.5	131.2	134.9	138.5	142.5	146.9	152.3	160.9	167.8		
21	493	117.7	122.0	127.0	131.6	135.3	138.9	143.0	147.2	152.6	160.7	167.3		
22	328	117.2	122.1	128.0	132.1	135.3	138.7	142.9	147.8	153.5	160.0	163.1		
23	2 32	118.0	122.2	126.7	131.0	134.7	138.3	142.2	146.4	151.8	163.8	170.0		

Age at nearest	ge at nearest No. of Values in Inches in the following Percentile Grades.												
Birthday.	observations.	5	10	20	30	40	50	60	70	80	90	95	
15													
16	110	31.050	31.600	32.270	32.692	33.110	33.500	33.893	34.285	34.680	35.150	35.577	
17	225	32.008	32.400	33.083	33.460	33.833	34.180	34.500	34.821	35.240	35.800	36.135	
18	243	32.915	33.174	33.548	33.921	34.278	34.630	35.000	35.044	35.677	36.074	36.602	
19	200	33.050	33.333	33.889	34.307	34.700	35.055	35.333	35.611	35.888	36.462	36.850	
20	165	35.185	33.543	34.150	34.562	34.975	35.254	35.528	35.800	36.137	36.707	37.000	
21	103	33.643	34.100	34.549	34.995	35.222	35.445	35.670	35.893	36.235	36.683	36.907	
22	68	33.266	33.644	34.225	34.675	35.050	35.320	35.592	35.864	36.309	36.927	37.433	
23	46	34.018	34.288	34 . 450	34.737	35.026	35.333	35.640	35.946	36.300	36.646	36.823	

TABLE XXI. The Height, Sitting.

TABLE XXII. The Perineal Height.

Age at nearest	No. of	Values in Inches in the following Percentile Grades.											
Birthday.	observations.	5	10	20	30	40	50	60	70	80	90	95	
15	90	29.545	31.000	31.644	32.120	32.650	33.125	33.500	33.875	34.461	35.222	35.722	
16	235	31.150	31.520	32.368	32.987	33.411	33.830	34.245	34.657	35.118	35.808	36.477	
17	409	32.084	32.583	33.287	33.780	34.213	34.600	35.000	35.401	36.121	36.537	37.030	
18	490	32.500	33.135	33.800	34.260	34.634	35.007	35.357	35.707	36.110	36.781	37.3:4	
19	454	33.033	33.480	34.150	34.525	34.800	35.243	35.560	35.874	36.331	36.885	37.554	
20	395	33.209	33.679	34.245	34.618	35.000	35.310	35.629	36.071	36.440	36.970	37.720	
21	318	32.926	33.450	34.180	34.600	35.012	25.340	35.670	36.000	36.483	36.972	37.670	
22	212	33.270	33.771	34.348	34.800	35.176	35.492	35.810	36.221	36.779	37.500	37.900	
23	160	33.500	34.090	33.576	35.040	35.350	35.654	35.961	36.535	36.700	37.177	37.650	

TABLE XXIII.

The Circumference of the Chest midway between Inspiration and Expiration.

Age at nearest	No. of		Values in Inches in the following Percentile Grades.											
Birthday.	observations.	5	10	20	30	40	50	60	70	80	90	95		
15	I 32	26.600	27.262	28.070	28.700	29.300	29.952	30.470	31.063	31.664	32.483	33.000		
16	395	27.980	28.464	29.333	30.071	30.584	31.101	31.635	32.000	32.712	33.513	34.150		
17	722	28.740	29.170	30.480	31.061	31.478	31.895	32.324	32.751	33.347	34.221	34.843		
18	841	30028	30.588	31.322	31.832	32.275	32.685	33.135	33.715	34.354	35.100	35.813		
19	750	30.814	31.300	32.011	32.428	32.844	33.250	33.710	34 . 184	34.735	35.481	35.944		
20	645	31.078	31.500	32.153	32.700	33.165	33.588	34.000	34.489	34.960	35.804	36.576		
21	496	31.152	31.580	32.280	32.720	33.270	33.656	34.055	34.546	35.060	35.834	36.680		
22	328	31.231	31 . 744	32.384	32.000	33.345	33.776	34.208	34.640	35.142	36.000	36.873		
23	232	31.255	31.900	32.474	33.029	33.451	33.873	34.265	34.646	35.055	35.855	36.822		

TABLE XXIV.

The Lung-capacity ascertained by means of the Spirometer.

Age at nearest	No. of		Values in Cubic Inches in the following Percentile Grades.											
Birthday.	observations.	5	10	20	30	40	5 0	60	70	80	90	95		
15	132	117.2	132.0	148.4	156.4	166.2	178.2	190.0	198.9	205.5	219.5	233.5		
16	395	143.2	152.1	166.8	176.3	185.9	193.5	199.4	210.7	224.0	237.0	253.5		
17	722	156.4	171.0	181.9	192.7	198.8	208.8	216.8	228.5	238.8	252.7	263.1		
18	841	170.0	180.0	192.3	203.5	212.5	219.0	227.7	236.0	245.7	260.0	272.2		
19	750	181.0	192.3	203.3	213.2	220.8	228.3	235.6	243.4	253.1	268.6	287.0		
20	645	185.6	194.3	206.9	215.8	224.0	233.2	242.0	249.6	261.0	277.6	290.7		
21	493	185.7	194.6	207.0	219.5	224.1	232.2	240.0	248.3	259.0	277.4	287.5		
22	328	194.0	203.4	214.5	222.5	231.1	237.9	245.8	254.6	263.8	286.5	298.5		
23	232	194.7	204.0	211.5	221.0	230.0	236.3	245.3	255.1	264.6	276.2	285.5		

TABLE XXV.

The Span, in Inches, of the Arms.

Age at nearest	No. of		Values in the following Percentile Grades.											
Birthday.	observations.	5	10	20	30	40	50	60	70	80	90	95		
15	33	60.65	61.65	62.52	63.25	64.05	64.50	64.97	65.55	67.48	68.35	68.78		
16	110	60.90	63.00	64.54	65.42	66.25	66.80	67.44	68.15	69.00	70.25	71.83		
17	225	63.61	64.61	65.74	66.57	67.27	67.90	68.54	69.27	70.24	71.54	72.57		
18	243	64.47	65.23	66.16	67.14	67.91	68.55	69.23	69.81	70.80	72.12	73.00		
19	200	64.45	65.66	66.90	67.60	68.34	69.03	69.64	70.40	71.35	72.50	73.55		
20	165	64.88	66.13	67.15	67.97	68.70	69.40	70.12	71.07	71.82	73.34	73.80		
21	103	65.30	67.03	68.12	68.91	69.44	69.93	70.63	71.32	71.96	73.34	74.62		
22	68	65.10	66.00	67.20	68.05	68.90	69.60	70.35	71.23	72.28	73.80	74.43		
23	46	67.05	67.43	68.60	69.27	69.60	69.93	70.60	71.27	71.85	72.85	73.85		

TABLE XXVI.

The Circumference, in Inches, of the Waist.

Age at nearest	No. of	Values in the following Percentile Grades.										
Birthday.	observations.	5	10	20	30	40	50	60	70	80	_ 90	95
15	134	21.67	22.67	23.50	24.09	24.62	25.12	25.53	25.93	26.53	27.60	28.61
16	395	23.23	23.75	24.47	25.06	25.41	25.77	26.18	26.71	27.31	27.97	28.80
17	722	23.84	24.38	25.13	25.57	26.00	26.45	26.90	27.42	27.96	28.78	29.48
18	841	24.21	24.86	25.69	26.28	26.75	27.22	27.70	28.21	28.59	29.68	30.43
19	750	24.33	25.20	26.03	26.60	27.15	27.60	28.05	28.53	29.02	29.82	30.65
20	645	24.68	25.32	26.19	26.83	27.32	27.98	28.26	28.53	29.58	30.66	31.40
21	493	24.58	25.23	26.07	26.66	27.21	27.69	28.21	28.85	29.62	30.54	31.19
22	328	25.00	25.53	26.24	26.76	27.28	27.81	28.35	28.01	29.46	30.25	31.00
23	232	24.87	25.53	26.40	27.03	27.46	27.89	28.48	29.13	29.84	30.85	31.70

Right Hand Squeeze in Pounds. Values at the following Percentile Grades. Age at nearest No. of 30 | 50 70 Birthday. observations. 5 10 20 40 60 80 95 90 46 120 38.0 40.6 46.3 58.6 65.2 68.0 53.0 62.1 60.0 64.0 70.3 76.8 79.0 81.2 80.0 51.0 57.1 62.8 68.0 70.7 78.0 80.1 55.5 60.7 59.0 66.1 90.0 73·5 81.0 94.0 96.8 75.2 225 70.0 72.5 84.2 89.4 243 65.7 68.0 70.4 74.5 78.8 80.3 77.2 83.1 88.1 86.6 91.7 97.6 75.9 77.8 79.6 77.0 83.8 65.6 85.2 200 72.6 91.6 102.5 83.8 85.8 85.0 20 21 22 165 69.7 71.0 68.4 74·7 75·6 72·5 78·6 89.8 95.2 96.7 99.0 103.0 67.1 66.0 82.7 81.6 89.5 103 68 92.7 89.2 102.1 107.0 105.0 107.1 98.9 94·4 97·6 23 46 68.9 72.0 ł 86.7 89.0 92.1 99.7 95.5

1	ABLE XXVIII.														
Left Hand Squeeze in Pounds.															
Age at nearest	No. of	Values in the following Percentile Grades.													
Birthday.	observations.	5	5 10 20 30 40 50 60 70 80 90												
15	3 6	33.0	36.0	43+0	49.6	54.2	56.4	58.0	59.6	64.6	71.0	75.5			
16	110	45.0	50.9	55.6	59.0	62.1	65.0	66.7	68.6	72.0	80.0	85.0			
17	225	55.0	58.9	64.7	68.6	71.6	73.5	76.1	79.4	82.7	87.5	92.7			
18	245	57.5	61.6	66.5	69.0	71.6	75.0	77.6	80.0	84.5	89.2	94.8			
19	200	64.4	66.8	70.8	74.4	78.3	81.5	83.1	86.1	89.5	96.3	99.6			
20	165	63.3	66.8	71.9	76.0	79.3	82.0	84.6	90.0	94.0	99.4	104.2			
21	103	67.7	71.5	75.7	78.8	81.7	84.5	87.3	90.0	93.7	99.7	104.8			
22	68	65.2	67.1	72.0	77.0	80.0	83.8	86.8	89.4	94.5	99.4	103.2			
23	46	66.5	69.0	77.2	80.4	82.7	85.0	87.3	89.6	92.3	97.2	104.2			

TABLE XXVII.

Age at nearest				Vali	ues in th	e follow	ing Per	centile (Grades.			
Birthday.	5	10	20	30	40	50	60	70	80	90	95	Average.
15-16	14.0	13.3	10.6	10.1	11.4	8.4	8.8	8.0	10.0	0.8	14.2	TLO
16-17	8.4	7.9	8.4	8.0	6.8	7.0	7.1	7.1	7.0	7.2	5.4	7.0
17-18	6.8	6.8	8.0	7.0	6.9	7.0	7.4	7.5	8.5	9.3	6.4	8.4
18-19	5.1	6.7	4.8	5.6	5.4	5.3	6.2	5.3	3.7	5.4	7.1	6.32
19-20	1.7	5.2	1.7	1.7	1.6	1.5	0.4	1.6	2.6	2.9	2.7	1.5
20-21	1.7	3.2	0.5	0.4	0.4	0.4	0.5	0.3	0.3	-0.2	-0.5	-1.2
21-22	-0.5	0.1	1.0	0.5	0.0	-0.2	-0.1	0.6	0.9	-0.7	-4.2	-1.3
22-23	2.8	0.1	1.3	-1.1	-0.6	-0.4	-0.7	-1.4	-1.7	3.8	6.9	2.7
					TABLE	XXX.						
		T	he Abso	lute An	nual Inc	rease in	Height	, Standi	ng.			
A			17		1		11	D	11- C	1		
Ageat nearest			•	atues m	Inches	in the io	nowing	rercen	the Gra	aes.		
Birthday.			({50}	60		80	90	95	Average.
15-16	2.243	2.239	1.151	2.027	1.793	1.515	1,570	1.536	1.367	1.283	1.177	2.13
16-17	1.380	1.668	1.451	1.273	1.184	1.195	1.172	1.117	1.080	1.320	0.914	1.12
17-18	1.003	1.283	0.721	0.030	0.010	0.033	0.024	0.603	0.565	0,200	0.210	0.24
10-19	0.407	0.391	0.304	0.301	0.300	0.018	0.349	0.323	0.121	0.400	0.350	0.01
20-21	0.202	0.152	0.103	-0.250	-0.008	-0.027	0.210	0.234	-0.407	0.200	0.240	0.05
21-22	-0.025	0.211	0.147	0.146	0.005	0.127	0.108	0.444	0.452	0.422	0.258	-0.15
22-23	0.342	-0.031	0.000	0.100	0.248	0.170	0.070	-0.302	-0.325	-0.303	- 0.258	0.17
					-	3737377			- 5-5			
			Che Abe	olute A	I ABLE	AAAI	n Heigh	+ Sittin	~			
			ine nos	onute A	anual 10	er case l	iteign	, onth	5.			
Age at nearest			V	alues ir	Inches	in the fe	ollowing	Percer	tile Gra	des.		
Birthday.	5	10	20	30	40	50	60 [70	80	90	95	Average.
16-17	0.958	0.800	0.813	0.768	0.723	0.680	0.607	0.536	0.560	0.650	0.558	0.50
17-18	0.907	0.774	0.465	0.461	0.445	0.450	0.500	0.223	0.437	0.274	0.467	0.75
18-19	0.135	0.159	0.341	o. 386	0.422	0.425	0.333	0.567	0.211	0.3 88	0.248	0.75
19-20	0.135	0.210	0.201	0.255	0.275	0.199	0.195	0.189	0.249	0.245	0.150	0.73
20-21	0.458	0.557	0.399	0.433	0.247	0.191	0.142	0.093	0.098	-0.024	-0.093	-0.23
22-22	-3.77	-0.450	0.324	-0.320	-0 172	-0.125	-0.070	-0.029			0.520	0.00
	01752	01044	0.225	0.0021		0.013	01040	01001	0.009	01201		
		7		-1 4 -	TABL	E XXX	(11. D	.1 11.1	۲.			
		1	ne Abs	olute Al	inual In	crease in	1 Perine	al neig	nt.			
Age at nearest			v	alues in	Inches	in the fo	ollowing	Percen	tile Gra	des.		
Birthday.	5	10	20	30	40	50	60	70	80	90	95	Average.
15-16	1.625	0.220	0.724	0.867	0.761	0.705	0.745	0.782	0.657	0.586	0.755	1.20
16-17	0.934	1.363	0.010	0.793	0.802	0.770	0.745	0.744	1.003	0.720	0.553	0.80
17-18	0.416	0.552	0.513	0.480	0.421	0.407	0.357	0.306	0.091	0.244	C.284	0.60
18-19	0.533	0.345	0.350	0.265	0.166	0.236	0.203	0.167	0.221	0.104	0.240	1.30
19-20	0.166	0.199	0.095	0.093	0.200	0.067	0.069	0.197	0.109	0.085	0.166	-0.90
20-21	-0.273	-0.229	-0.005	-0.018	0.012	0.030	0.041	-0.071	0.043	0,002		-1.00
21-22	0.344	0.2211								0	-0.050	
44-40	0.000	0.321	0.100	0.200	0.104	0.152	0.140	0.221	0.296	0.528	0.230	1.00
	0.220	0.319	0.228	0.200	0.104	0.152	0.140 0.151	0.221 0.314	0.296 -0.079	0.528 -0.323	0.230	1.00
	0.220	0.319	0.103	0.200	0.104 0.174 TABLE	0.152 0.162 XXXII	0.140 0.151	0.221	0.296 -0.079	0.528 -0.323	0.230	1.00
	0.220	0.319	o.228	0.200 0.240	O.104 O.174 TABLE al Increa	0.152 0.162 XXXII ise in Ci	0.140 0.151 I. ircumfer	0.221 0.314	0.296 -0.079 Chest.	0.528	0.230	1.00
Age at nearest	0.220	0.319 The	Absolut V	o.200 o.240 e Annu: alues ir	TABLE al Increa	0.152 0.162 XXXII ase in Ci in the fo	0.140 0.151 I. ircumfer ollowing	o.221 o.314 ence of Percen	0.296 -0.079 Chest. tile Gra	0.528 -0.323 des.	0.230 	1.00 0.00
Age at nearest Birthday.	0.220	0.319 0.319	0.103 0.228 Absolut V 20 1	o.200 o.240 e Annu: alues ir 30	TABLE al Increa 1 Inches	0.152 0.162 XXXII ase in Ci in the fo 50	0.140 0.151 I. ircumfer ollowing 60	o.221 o.314 rence of Percen	0.296 -0.079 Chest. tile Gra 80	0.528 -0.323 des. 90	0.230 025 025	1.00 0.00 Average.
Age at nearest Birthday. 15-16	0.220	0.319 0.319 The	$\frac{0.103}{0.228}$ Absolut $\frac{1}{20}$ 1.263	0.200 0.240 e Annu: Values ir <u>30</u> 1.371	$ \begin{array}{r} 0.104 \\ 0.174 \\ TABLE \\ al Increa \\ 1nches \\ \hline 40 \\ \overline{1.284} \end{array} $	$ \begin{array}{r} \text{o.152}\\ \text{o.162}\\ \text{XXXII}\\ \text{ase in Ci}\\ \text{in the fo}\\ \hline \begin{array}{r} 50\\ \hline 1.149\end{array} $	0.140 0.151 I. ircumfer ollowing <u>60</u> 1.165	0.221 0.314 rence of Percen 70 0.937	0.296 -0.079 Chest. tile Gra 80 1.048	0.528 -0.323 des. 90 1.030	95 1.150	1.00 0.00 Average. 1.17
Age at nearest Birthday. 15-16 16-17	0.220 5 1.383 0.757	10 1.202 0.706	$\frac{0.103}{0.228}$ Absolut $\frac{20}{1.263}$ 1.147	0.200 0.240 e Annu: alues ir <u>30</u> 1.371 0.990	0.104 0.174 TABLE al Increz 1 Inches 40 1.284 0.894	0.152 0.162 XXXII ase in Ci in the fo 50 1.149 0.794	0.140 0.151 I. ircumfer ollowing <u>60</u> 1.165 0.689	0.221 0.314 rence of g Percen 70 0.937 0.751	0.296 -0.079 Chest. tile Gra 80 1.048 0.635	0.528 -0.323 des. 90 1.030 0.708	95 	1.00 0.00 Average. 1.17 0.83
Age at nearest Birthday. 15-16 16-17 17-18	0.220 5 1.383 0.757 1.288	10 10 1.202 0.706 1.418	Absolut 20 1.263 1.147 0.942	0.200 0.240 e Annu: alues ir <u>30</u> 1.371 0.990 0.771	0.104 0.174 TABLE al Increa 1 Inches 40 1.284 0.894 0.797	0.152 0.162 X X X II ase in Ci in the fo 50 1.149 0.794 0.790	0.140 0.151 I. ircumfer ollowing 60 1.165 0.689 0.811	0.221 0.314 rence of Percen 70 0.937 0.751 0.964	0.296 -0.079 Chest. atile Gra 80 1.048 0.635 1.007	0.528 -0.323 des. 90 1.030 0.708 0.879	95 0.693 0.230 0.230 0.025	1.00 0.00 Average. 1.17 0.83 0.94
Age at nearest Birthday. 15-16 16-17 17-18 18-19 10 00	5 1.383 0.757 1.288 0.786	10 10 1.202 0.706 1.418 0.712	Absolut 20 1.263 1.147 0.942 0.689	0.200 0.240 e Annu: alues ir 30 1.371 0.990 0.771 0.596	0.104 0.174 TABLE al Incres 10.100 1.284 0.894 0.797 0.569	0.152 0.162 XXXII ase in Ci in the fo 50 1.149 0.794 0.790 0.565	0.140 0.151 I. ircumfer ollowing <u>60</u> 1.165 0.689 0.811 0.575	0.221 0.314 rence of Percen 70 0.937 0.751 0.964 0.469	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381	95 1.150 0.693 0.970 0.131	1.00 0.00 Average. 1.17 0.83 0.94 1.54
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20 21	5 1.383 0.757 1.288 0.766 0.264	10 1.202 0.706 1.418 0.712 0.200	Absolut 20 1.263 1.147 0.942 0.689 0.142	0.200 0.240 e Annu: alues ir 30 1.371 0.990 0.771 0.596 0.272	$ \begin{array}{r} 0.104 \\ 0.174 \\ TABLB \\ al Increation Increatio Increation Increation Increation Increation Inc$	0.152 0.162 XXXII ase in Ci in the fo 1.149 0.794 0.790 0.565 0.338	0.140 0.151 I. ircumfer ollowing <u>60</u> 1.165 0.689 0.811 0.575 0.290	0.221 0.314 rence of Percen 70 0.937 0.751 0.964 0.305	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323	95 1.150 0.693 0.970 0.131 0.532	1.00 0.00 Average. 1.17 0.83 0.94 1.54 -0.70
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22	5 1.383 0.757 1.288 0.786 0.264 0.074	10 1.202 0.706 1.418 0.712 0.200 0.080 0.761	Absolut 20 1.263 1.147 0.942 0.689 0.142 0.127 0.228	0.200 0.240 e Annu 'alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020	0.104 0.174 TABLE al Increa 1nches 40 1.284 0.894 0.797 0.569 0.321 0.105	0.152 0.162 X X XII ase in Ci in the for 1.149 0.794 0.790 0.565 0.338 0.063	0.140 0.151 ircumfer ollowing 60 1.165 0.6 ⁸ 9 0.811 0.575 0.290 0.055	0.221 0.314 ence of Percen 70 0.937 0.751 0.964 0.305 0.305 0.305	0.296 -0.079 Chest. itile Gra 0.635 1.048 0.635 1.007 0.381 0.235 0.100	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.323 0.166	95 1.150 0.532 0.131 0.532 0.104	Average. 1.00 0.00 Average. 1.17 0.83 0.94 1.54 -0.70 0.00
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23	5 1.383 0.757 1.288 0.786 0.264 0.074 0.079 0.024	10 1.202 0.706 1.418 0.712 0.200 0.080 0.164 0.156	Absolut 20 1.263 1.147 0.942 0.689 0.142 0.127 0.104 0.000	0.200 0.240 e Annu: 7alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.180	0.104 0.174 TABLE al Increz 1 Inches 40 1.284 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.979 0.321 0.105 0.075	0.152 0.162 X X XII ise in Co in the fo 50 1.149 0.794 0.794 0.565 0.338 0.063 0.120	0.140 0.151 I. ircumfer ollowing 0.1165 0.60 0.811 0.575 0.290 0.055 0.153 0.055	0.221 0.314 rence of 2 Percen 70 0.937 0.751 0.964 0.469 0.305 0.057 0.106 0.006	0.296 -0.079 Chest. itile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.082	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.030 0.166 -0.145	95 	Average. 1.00 0.00 Average. 1.17 0.83 0.94 1.54 -0.70 0.00 0.05 0.45
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23	5 1.383 0.757 1.288 0.786 0.264 0.074 0.079 0.024	10 1.202 0.706 1.418 0.712 0.200 0.880 0.164 0.156	Absolut 20 1.263 1.147 0.689 0.142 0.127 0.104 0.090	0.200 0.240 e Annu: 'alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.180 0.129	0.104 0.174 TABLE al Increz 1 Inches 40 1.284 0.894 0.321 0.105 0.321 0.105 0.075 0.066	0.152 0.162 XXXII in the fo 50 1.149 0.794 0.765 5.0.338 0.068 0.120 0.097	0.140 0.151 II. ircumfet ollowing 60 1.165 0.689 0.811 0.575 0.290 0.055 0.153 0.057	0.221 0.314 rence of g Percent 70 0.937 0.751 0.964 0.469 0.305 0.057 0.106 0.006	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.030 0.166 -0.145	95 1.150 0.633 0.693 0.970 0.131 0.532 0.104 0.193 -0.051	Average. 1.17 0.83 0.94 1.54 -0.70 0.05 0.45
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23	0.220 1.383 0.757 1.288 0.786 0.264 0.074 0.079 0.024	0.319 The 10 1.202 0.706 1.418 0.712 0.200 0.080 0.164 0.156 The Ab	Absolut 20 1.263 1.147 0.942 0.142 0.127 0.142 0.090 Solute	0.200 0.240 e Annu: 'alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.180 0.129	0.104 0.174 TABLE Increation 1 ncreation 1 ncreation 0.894 0.797 0.569 0.321 0.105 0.075 0.066 TABLE Norrest	0.152 0.162 XXX11 ase in C in the fo 0.149 0.794 0.790 0.565 0.338 0.068 0.120 0.097 XXX11	0.140 0.151 ircumfet ollowing 60 1.165 0.689 0.811 0.575 0.290 0.055 0.153 0.057	0.221 0.314 rence of g Percent 70 0.937 0.751 0.964 0.305 0.057 0.106 0.006	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.030 0.166 -0.145	95 1.150 0.693 0.970 0.131 0.532 0.104 0.193 -0.051	Average. 1.17 0.83 0.94 1.54 -0.70 0.00 0.05 0.45
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23	0.220 1.383 0.757 1.288 0.786 0.264 0.074 0.079 0.024	0.319 The 10 1.202 0.712 0.200 0.800 0.164 0.156	Absolut V 20 1.263 1.147 0.942 0.142 0.127 0.144 0.090 solute A	0.200 0.240 e Annu: 'alues ir 'alues ir 0.900 0.771 0.596 0.272 0.020 0.180 0.129	0.104 0.174 TABLE Increation 1 ncreation 1 ncreation 0.894 0.797 0.569 0.321 0.105 0.075 0.066 TABLE ncrease	0.152 0.162 XXX11 ase in C in the fo 50 0.794 0.790 0.565 0.338 0.068 0.120 0.097 XXX1V in Lung	0.140 0.151 ircumfer 0llowing 60 1.165 0.689 0.811 0.575 0.290 0.055 0.153 0.057 V. -capaci	0.221 0.314 ence of g Percen 70 0.937 0.751 0.964 0.469 0.305 0.057 0.106 0.006	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 irometei	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.030 0.166 -0.145 f.)	95 	Average. 1.17 0.83 0.94 1.54 -0.70 0.05 0.45
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23 Age at nearest	5 1.383 0.757 1.288 0.765 0.264 0.074 0.079 0.024	10 1.202 0.706 1.202 0.706 0.712 0.200 0.164 0.156 The Ab	Absolut V 20 1.263 1.147 0.942 0.689 0.142 0.127 0.104 0.090 solute A Valu	0.200 0.240 e Annu: 'alues ir 30 1.371 0.990 0.771 0.596 0.772 0.020 0.180 0.129	0.104 0.174 TABLE al Incres 1 Inches 1 Inches 1 Inches 1 100 1.284 0.894 0.797 0.321 0.105 0.075 0.006 TABLE ncrease	0.152 0.162 XXXII ase in C 50 1.149 0.794 0.790 0.565 0.338 0.068 0.069 0.097 XXXIV in Lung 105 in th	0.140 0.151 ircumfer ollowing 60 1.165 0.689 0.811 0.575 0.290 0.055 0.153 0.057 V. -capacit	0.221 0.314 ence of g Percen 70 0.937 0.751 0.964 0.469 0.305 0.057 0.106 0.006 ty. (Sp ring Per	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile (0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.030 0.166 -0.145 c.) Grades.	95 1.150 0.693 0.970 0.131 0.532 0.104 0.193 -0.051	Average. 1.10 0.00 Average. 1.17 0.83 0.94 1.54 -0.70 0.00 0.05 0.45 45
Age at nearest Birthday. 15-16 16-17 17-18 18-19 20-21 21-22 22-23 Age at nearest Birthday.	5 1.383 0.757 1.288 0.786 0.264 0.074 0.079 0.024	10 1.202 0.706 0.712 0.706 0.712 0.706 0.7164 0.156 The Ab 10	Absolut V 20 1.263 1.147 0.942 0.639 0.142 0.639 0.142 0.639 0.142 0.639 0.142 0.639 0.142 0.639 0.142 0.639 0.103	0.200 0.240 e Annu: 'alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.180 0.129 Linnual 1 tes in Ct	0.104 0.174 TABLE al Incres 1 Inches 40 1.284 0.894 0.569 0.321 0.105 0.075 0.066 TABLE ncrease ubic Incl	0.152 0.162 X X XII ase in C 50 1.149 0.794 0.795 0.565 0.338 0.668 0.668 0.697 X XXIV in Lung ues in th 50	0.140 0.151 I. ircumfet ollowing 0.165 0.689 0.811 0.575 0.153 0.057 V. -capacit te follow 60	0.221 0.314 ence of g Percent 0.937 0.751 0.964 0.469 0.305 0.057 0.106 0.006 ty. (Sp ring Per 70	0.296 -0.079 Chest. atile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile G	0.528 -0.323 des. 90 1.030 0.708 0.879 0.387 0.323 0.030 0.166 -0.145 c.) Grades. 90	95 95 1.150 0.693 0.970 0.131 0.532 0.104 0.051 95	Average. 1.17 0.33 0.94 1.54 -0.70 0.05 0.45 0.45 Average.
Age at nearest Birthday. 15-16 16-17 17-18 18-19 20-21 21-22 22-23 Age at nearest Birthday. 15-16	0.220 5 1.383 0.757 1.288 0.764 0.264 0.074 0.074 0.024 	0.319 0.319 The 10 1.202 0.702 0.712 0.203 0.156 The Ab 10 20.1	Absolut 20 1.263 1.147 0.942 0.689 0.142 0.127 0.104 0.090 solute A Valu 20 18.4	0.200 0.240 e Annu: alues ir alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.180 0.129 Nnnual 1 tes in Ct 30 19.9	0.104 0.174 TABLE al Incress 1 Incress 1 Incress 1 Incress 1 Incress 1 Incress 1 Incress 0.757 0.066 TABLE ncrease 1 Incress 1	0.152 0.162 XXXIII ase in C in the f. 50 1.149 0.794 0.796 0.565 0.338 0.603 0.007 XXXIV in Lung 1es in th 50 15.3	0.140 0.151 I. ircumfer ollowing 60 1.165 0.629 0.811 0.575 0.290 0.055 0.057 V. -capacitice follow 60 9.4	0.221 0.314 rence of 2 Percen 0.937 0.751 0.964 0.469 0.305 0.007 0.106 0.006 v. (Sp ring Per 70 11.8	0.296 -0.079 Chest. tille Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile (80 18.5	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.030 0.166 -0.145 c.) Grades. 90 17.5	95 1.150 0.693 0.970 0.131 0.532 0.104 0.193 -0.051 95 20.0	Average. 1.00 0.00 Average. 1.17 0.83 0.94 1.54 0.70 0.05 0.45 Average. 18.0
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23 22-23 Age at nearest Birthday. 15-16 16-17 16-17	0.220 1.383 0.757 1.288 0.786 0.264 0.074 0.074 0.024 0.	10 10 1.202 0.706 1.418 0.712 0.200 0.080 0.164 0.156 The Ab 10 20.1 18.9	Absolut 20 1.263 1.147 0.942 0.689 0.142 0.689 0.142 0.090 solute A Valu 20 1.263 1.147 0.942 0.192 1.263 1.147 0.942 0.192 1.263 1.147 0.942 0.192 1.263 1.147 0.942 0.142 0.192 1.147 0.942 0.14	0.200 0.240 e Annu: alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.180 0.129	0.174 0.174 TABLE al Incress 1 Inchess 40 1.284 0.797 0.569 0.321 0.105 0.075 0.066 TABLE ncrease ubic Incl 40 1.2.9	0.152 0.162 XXXII ase in C in the f <u>50</u> 1.149 0.794 0.790 0.565 0.338 0.663 0.607 XXXIV in Lung 1es in th <u>50</u> 1.149 0.794 0.790 0.565 0.338 0.607 1.53 1.53	0.140 0.151 I. ircumfer ollowing 60 1.165 0.689 0.811 0.575 0.290 0.055 0.055 0.055 0.055 V. -ccapacil te follow 9.4 17.4	0.221 0.314 rence of 2 Percer 0.937 0.751 0.964 0.469 0.305 0.057 0.106 0.006 v.057 0.106 0.006 v.057 0.106 0.006	0.296 -0.079 Chest. tille Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile (80 18.5 14.8 	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.030 0.166 -0.145 f.) Drades. 90 17.5 15.7	95 	Average. 1.17 0.83 0.94 1.54 -0.70 0.05 0.45
Age at nearest Birthday. 15-16 16-17 17-18 18-19 20-21 21-22 22-23 Age at nearest Birthday. 15-16 16-17 17-18 18-19	0.220 1.383 0.757 1.288 0.757 1.288 0.786 0.264 0.079 0.024 5 26.0 13.2 14.4	0.319 The 10 1.202 0.706 1.418 0.712 0.200 0.080 0.164 0.156 The Ab 10 20.1 18.9 9.0	Absolut 20 1.263 1.147 0.942 0.1689 0.1422 0.127 0.104 0.090 solute A Valu 20 18.4 Valu 20 18.4 15.1 10.4	0.200 0.240 e Annu: falues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.129 0.129 0.129 0.129 0.129	0.174 0.174 TABLE al Incress 1 Inchess 1 Inchess 1 Inchess 1 Inchess 1 Inchess 1 Inchess 1 Inchess 1 Inchess 0.894 0.797 0.569 0.321 0.105 0.075	0.152 0.162 XXXII ase in C in the f 50 1.149 0.794 0.795 0.565 0.338 0.063 0.120 0.097 XXXIV in Lung tes in th 50 15.3 15.3 15.3 15.3	0.140 0.151 1. ircumfer 000000000000000000000000000000000000	0.221 0.314 rence of percent 0.937 0.751 0.964 0.305 0.305 0.0057 0.106 0.305 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0.106 0.0057 0	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile 6 80 18.5 1.4.8 6.9	0.528 -0.323 des. 90 1.030 0.708 0.323 0.030 0.1030 0.145 0.155 0.145 0.155 0.145 0.155 0.145 0.155 0.155 0.145 0.155 0.155 0.145 0.155 0.155 0.155 0.155 0.145 0.155 0.	95 	Average. 1.00 0.00 Average. 1.17 0.83 0.94 1.54 -0.70 0.00 0.05 0.45 0.45 Average. 18.0 16.0 9.0 14.0
Age at nearest Birthday. 15-16 16-17 17-18 18-19 20-21 21-22 22-23 Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20	0.220 1.383 0.757 1.288 0.766 0.264 0.074 0.079 0.024 1.00 1.3.2 0.024	10 1.202 0.706 0.418 0.702 0.200 0.164 0.156 The Ab 10 20.1 18.9 9.0 12.3	0.103 0.228 Absolut V 20 1.263 1.147 0.942 0.142 0.127 0.104 0.090 solute A Valu 20 18.4 15.1 10.4	0.200 0.240 e Annu: 'alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.180 0.129	0.104 0.174 1 TABLE al Incress 1 Inchess 1 1.284 0.797 0.569 0.321 0.105 0.075 0.0666 TABLE ncrease bbic Incl 19.7 12.9 13.7 13.7 13.7	0.152 0.162 X X XII ase in C in the f 50 1.149 0.794 0.795 0.338 0.063 0.565 0.338 0.063 0.097 X XXIV in Lung 15.3 15.3 15.2 9.3	0.140 0.151 1. ircumfer ollowing 60 1.165 0.689 0.811 0.575 0.290 0.055 0.153 0.057 V. .:capaci te follow 60 9.4 17.4 10.9 9.7.9	0.221 0.314 ence of g Percen 70 0.937 0.751 0.964 0.305 0.057 0.106 0.006 v.(Sp ring Per 70 11.8 17.8 5 7.4	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile G 80 18.5 14.8 6.9 7.4 7.4 7.4	0.528 -0.323 des. 90 1.030 0.708 0.879 0.381 0.323 0.030 0.166 -0.145 F.) Drades. 90 17.5 15.7 7.3 8.6 0.0	95 	Average. 1.00 0.00 Average. 1.17 0.83 0.94 1.54 0.70 0.05 0.45 Average. 18.0 16.0 9.0 14.0
Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23 22-23 Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21	5 1.383 0.757 1.288 0.264 0.079 0.024 5 26.0 13.2 14.4 11.0 4.6 0.1	0.321 0.310 10 1.202 0.706 1.418 0.712 0.200 0.156 The Ab 10 20.1 18.9 9.0 12.3 2.0 0.3 0.3 0.3 18.9 12.0 12.0 12.0 12.0 13.0 18.9 12.0 12.0 12.0 12.0 13.0 14.0 15.0	Absolut 20 1.163 1.147 0.942 0.689 0.142 0.127 0.104 0.090 solute A Valu 20 18.4 15.1 10.4 15.1 10.6 3.6 0.1	0.200 0.240 e Annu: 'alues ir 30 1.371 0.990 0.771 0.590 0.771 0.590 0.771 0.590 0.771 0.590 0.771 0.590 0.727 0.020 0.129 10.129 10.129 10.4 10.9 10.9 10.9 10.9 10.9 10.9 10.9 10.9	0.104 0.174 TABLE al Incres 1 Inches 40 1.284 0.894 0.797 0.569 0.321 0.105 0.066 TABLE ncrease bbic Incl 19.7 12.9 13.7 8.3 3.2 0.1	0.152 0.162 X X XII ase in C in the f 50 1.149 0.794 0.796 0.565 0.338 0.068 0.097 X X IV in Lung 1es in th 50 15.3 15.3 10.2 9.3 5.9 0.002	0.140 0.151 I. ircumfer bollowing 60 1.165 0.629 0.811 0.575 0.290 0.055 0.153 0.057 V. -capacil e follow 60 9.4 17.4 10.9 7.9 0.4 17.4	0.221 0.314 rence of g Percen 70 0.937 0.751 0.964 0.469 0.305 0.006 0.006 ty. (Sp ring Per 70 11.8 17.8 8.5 7.4 6.2	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile (80 1.048 0.635 1.007 0.381 0.235 1.007 0.381 0.235 1.007 0.087 1.048 0.635 1.007 0.087 1.048 0.635 1.007 0.087 1.007 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.007 0.087 1.08 0.037 1.08 0.087 1.087 1.0	0.528 -0.323 des. 90 1.030 0.708 0.879 0.323 0.030 0.166 -0.145 f.) Grades. 90 17.5 15.7 7.3 8.6 90 -1.02 -1	95 1.150 0.633 0.95 0.131 0.532 0.134 0.533 0.051 95 20.0 9.6 9.1 14.8 3.7 3.2	Average. 1.00 0.00 Average. 1.17 0.83 0.94 1.54 -0.70 0.05 0.45 0.05 0.45 Average. 18.0 16.0 9.0 14.0 -1.0 2.0
Age at nearest Birthday. 15-16 16-17 17-18 18-19 20-21 21-22 22-23 Age at nearest Birthday. 15-16 16-17 15-18 18-19 19-20 20-21 21-22	0.220 1.383 0.757 1.288 0.766 0.264 0.079 0.024 5 26.0 13.2 14.4 11.0 4.6 0.1 8.3	0.319 0.319 The 10 1.202 0.706 1.418 0.712 0.200 0.080 0.164 0.156 The Ab 10 20.1 18.9 9.0 12.3 2.0 0.3 8.8	Absolut 20 1.263 1.147 0.942 0.639 0.142 0.639 0.142 0.639 0.142 0.639 0.142 0.639 0.142 0.639 0.142 0.1	0.200 0.240 e Annu: 'alues ir 30 1.371 0.990 0.771 0.596 0.272 0.020 0.180 0.129 1.0.18 0.129 1.0.18 1.0.8 1.0.9 1.0.4 1.0.8 9.7 2.6 3.7 2.0	0.104 0.174 TABLE al Incres 1.284 0.894 0.797 0.569 0.321 0.105 0.075 0.075 0.075 0.075 0.075 0.075 1.284 1.197 1.284 1.284 0.1797 0.1321 0.104 1.284 0.1797 0.104 0.104 0.1797 0.104 0	$\begin{array}{c} 0.152\\ 0.162\\ 0.162\\ \end{array}$	0.140 0.151 I. ircumfer ollowing 60 1.165 0.629 0.811 0.575 0.290 0.055 0.290 0.055 0.290 0.055 0.290 0.055 0.290 0.055 0.290 0.055 0.290 0.055 0.290 0.055 0.290 0.0550 0.050	0.221 0.314 ence of g Percer 0.7037 0.751 0.964 0.469 0.305 0.057 0.106 0.006 0.006 0.006 0.006 11.8 17.8 17.8 17.8 17.8 5.5 7.4 4.6.2 0.2 1.3 6.3	0.296 -0.079 Chest. Itile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile (80 18.5 14.5	0.528 -0.323 des. 90 1.030 0.708 0.879 0.387 0.323 0.030 0.166 -0.145 f.) Grades. 90 17.5 15.7 7.3 8.6 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 -1.02 19.1 9.0 9.1 9.0 9.1 9.0 9.1 9.0 9.1 9.0 9.1 9.0 9.1 9.0 9.1 9.0 9.1 9.0 9.1 9.0 9.1 9.1 9.0 9.1 9.0 9.0 9.0 9.0 9.1 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	95 	Average. 1.00 0.00 Average. 1.17 0.83 0.94 1.54 -0.70 0.00 0.05 0.45 Average. 18.0 16.0 9.0 14.0 1.0 2.0 5.0
Age at nearest Birthday. 15-16 16-17 17-18 18-19 20-21 21-22 22-23 Age at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 20-21 21-22 22-23	0.220 1.383 0.757 1.288 0.766 0.264 0.074 0.079 0.024 1.00 1.3.2 2.6.0 1.3.2 1.4 1.1.0 1.4.4 1.1.0 1.6.3 0.7 1.2.8 0.074 0.079 0.024 0.074 0.079 0.024 0.074 0.075 0.024 0.075 0.024 0.075 0.024 0.075 0.024 0.075 0.024 0.075 0.024 0.075 0.024 0.075 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.025 0.024 0.024 0.024 0.024 0.024 0.024 0.025 0.05 0	10 1.202 0.766 0.712 0.200 0.766 0.712 0.200 0.766 0.712 0.200 0.766 0.712 0.200 0.764 0.156 10 20.1 18.90 9.0 12.3 2.0 0.33 8.8 0.6	Absolut 20 1.263 1.147 0.942 0.142 0.142 0.142 0.190 solute A Valu 20 18.4 15.1 10.4 0.090 18.4 15.1 10.4 1	0.200 0.240 e Annu: 'alues ir 0.990 0.771 0.596 0.272 0.020 0.180 0.129 10.4 10.8 9.7 2.0 3.7 2.0	0.104 0.174 TABLE al Incres 1 Inches 1.284 0.797 0.569 0.321 0.105 0.0755 0.00750000000000	$\begin{array}{c} 0.152\\ 0.162\\ 0.162\\ \end{array}$ X X XII ase in C in the f 50 1.149 0.794 0.790 0.565 0.338 0.063 0.505 0.308 0.097 X XXIV in Lung ues in th 50 15.3 15.3 10.2 9.3 5.9 0.0 5.7 -1.6	0.140 0.151 I. ircumfer ollowing 60 1.165 0.629 0.811 0.575 0.290 0.055 0.153 0.057 V. .:capaci te follow 60 9.4 17.4 10.9 7.9 7.9 7.9 5.8 5.8	0.221 0.314 ence of Percen 70 0.937 0.751 0.964 0.305 0.057 0.106 0.006 v.006 v.007 v.108 v.057 0.006 v.006 v.007 v.108 v.057 v.057 v.108 v.057 v.057 v.108 v.057	0.296 -0.079 Chest. tile Gra 80 1.048 0.635 1.007 0.381 0.235 0.100 0.082 -0.087 iromete: centile 6 80 18.5 14.8 6.9 -2.0 4.8 0.8 -2.0 4.8 0.8 -2.0	0.528 -0.323 des. 90 1.030 0.708 0.879 0.3879 0.3879 0.323 0.030 0.166 -0.145 .) Drades. 90 17.5 15.7 7.3 8.6 9.0 -1.02 19.7 1.02 1.	95 0.230 025 1.150 0.693 0.970 0.131 0.532 0.103 -0.051 95 20.0 9.6 9.1 1.4 9.7 -3.2 11.0 -13.0	Average. 1.00 0.00 Average. 1.17 0.83 0.94 1.54 0.94 1.54 0.94 1.54 0.94 1.54 0.94 1.54 0.05 0.45 Average. 18.0 16.0 9.0 14.0 -1.0 2.0 5.0 -4.0

TABLE XX1X. The Absolute Annual Increase in Weight in Pounds.

	TABLE XXXV. The Absolute Aunual Increase in Circumference of Waist.																		
e at nearest			v	alues in	Inches	in the fo	llowing	Percen	tile Gra	des.									
Birthday.	5	10	20	30	40	50	60	70	80	90	95	Average.							
15-16	1.56	1.08	0.97	0.97	0.79	0.65	0.65	0.78	0.78	0.37	0.19	0.91							
17-18	0.37	0.48	0.56	0.71	0.75	0.00	0.80	0.79	0.63	0.90	0.95	0.54							
18-19	0.12	0.34	0.34	0.32	0.40	0.38	0.35	0.32	0.43	0.14	0.22	0.30							
20-21	-0.10	-0.09	-0.12	-0.17	-0.11	-0.29	-0.05	0.02	0.04	-0.12	-0.21	0.06							
21-22	0.51	0.30	0.17	0.10	0.07	0.12	0.14	0.06	-0.16	-0.29	-0.19	0.12							
~~~~~	0.22	0.00			TABLE	XXXV	I.				1 01/0	0140							
e at pearest		j	The Abso	lute Ar	Inches	crease in	n the Sp	an of A	rms. Itile Gra	des									
Birthday.	5	10	20 1	30		50	60	1 70	80	90	95	Average.							
15-16	0.25	1.35	2.02	2.17	2.20	2.30	2.47	2.60	1.52	1.90	3.05	3.43							
16-17	2.71	1.61	1.20	1.15	1.02	1.10	1.10	1.12	1.24	1.29	0.74	0.77							
18-19	-0.02	0.43	0.42	0.46	0.43	0.48	0.41	0.59	0.55	0.32	0.55	0.80							
19-20	0.43	0.47	0.25	0.37	0.36	0.37	0.48	0.67	0.47	0.84	0.25	-0.02							
21-22	-1.20	-1.03	-0.92	-0.86	-0.54	-0.33	-0.28	-0.03	0.14	0.00	-0.19	-0.47							
22-23	2.95	1.43	1.40	I.22	0.70	0.33	0.25	-0.06	-0.43	-0.95	-0.58	-0.80							
		Th	e Absolu	ite Anni	TABLE I ual lncr	XXXVI ease in F	1. Right H	and Squ	eeze.										
e at nearest			V	alues in	Pounds	in the f	ollowing	g Percer	atile Gra	des.									
Birthday.	5			30	40		60	70		90	95	Average.							
15-16	13.0	14.9	12.7	9.1	6.6	8.0	6.7	5.5	6.5 7.4	3.1	10.0	10.50							
17-18	5.7	5.0	1.9	0.4	2.0	2.3	2.1	2.1	2.4	2.3	2.8	3.53							
18-19 19-20	2.8	3.1	4.6	5.5	4.3	4.5	5.1	5.0	5.0	5.9	5.7	4 00							
20-21	0.9	1.3	0.9	1.8	2.4	2.0	2.7	2.9	1.5	3.1	3.3	1.00							
21-22	-1.1	2.6	-3.1	-2.6	-1.1	-0.8	-2.4	-3.5	-2.3	-3.2	-2.0	-1.50							
~~~~~~	2.9	3.0			$\begin{array}{c ccccccccccccccccccccccccccccccccccc$														
												1							
		Ti	ne Absol	ute Ann	TABLE 3	XXXV1 ease in	II. Left Ha	and Sque	eze.										
ge at nearest Birthdor			ne Absol	ute Ann alues in	Pounds	KXXV1 ease in in the f	II. Left Ha	nd Sque	eze. Itile Gra	ides.	05								
çe at nearest Birthday. 15-16	5		$\frac{20}{12 \cdot 6}$	ute Ann alues in 30	$\frac{\Gamma_{ABLE}}{Pounds}$	$\frac{XXXV1}{\text{ease in}}$ in the f	II. Left Ha ollowing <u>60</u> 8.7	g Percer	eze. tile Gra $\frac{80}{7:4}$	edes.	95	A verage							
;e at nearest Birthday. 15-16 16-17	5 12.0 10.0	10 14.9 8.0	$\frac{20}{12.6}$	ute Ann alues in <u>30</u> 9.4 9.6	TABLE 2ual lnciPounds 40 7.9 9.5	$\frac{50}{8.6}$	II. Left Ha ollowing <u>60</u> 8.7 9.4	nd Sque g Percer 70 9.0 10.8	$\frac{80}{7\cdot4}$	edes.	<u>95</u> 9·5 7·7	A verage							
;e at nearest Birthday. 15-16 16-17 17-18 18-19	5 12.0 10.0 2.1	10 14.9 8.0 2.7	1.8	ute Ann alues in <u>30</u> 9.4 9.6 0.4	TABLE Control Pounds 40 7.9 9.5 0.0 6.7	$\begin{array}{c} \text{XXV1}\\ \text{ease in}\\ \text{in the f}\\ \hline \\ \hline \\ 50\\ \hline \\ 8.6\\ 8.5\\ 1.5\\ 6.5 \end{array}$	II. Left Ha ollowing <u>60</u> 8.7 9.4 1.5	rnd Sque g Percer 70 9.0 10.8 0.6 6.1	eze. ntile Gra 80 7.4 10.7 1.8	$\frac{90}{9.\circ}$	95 9·5 7·7 2.1	Average 10.0 6.6 3.4							
;e at nearest Birthday. 15-16 16-17 17-18 18-19 19-20	5 12.0 10.0 2.1 7.3 -1.1	10 14.9 8.0 2.7 5.2 0.0	1.1 Absol V: 20 12.6 9.1 1.8 4.3 1.1	ute Ann alues in <u>30</u> 9.4 9.6 0.4 5.4 1.6	TABLE Tual Inc. Pounds 40 7.9 9.5 0.0 6.7 1.0 1.0	XXXV1 ease in in the f 50 8.6 8.5 1.5 6.5 0.5	II. Left Ha ollowing 60 8.7 9.4 1.5 5.5 1.5	70 9.0 10.8 0.6 6.1 3.9	eeze. htile Gra 80 7.4 10.7 1.8 5.0 4.5	edes. 90 9.0 7.5 1.7 7.1 3.1	95 9·5 7·7 2·1 4.8 4·6	Average 10.0 6.6 3.4 3.0 2.0							
(e at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22	5 12.0 2.1 7.3 -1.1 4.3	10 14.9 8.0 2.7 5.2 0.0 4.7	20 12.6 9.1 1.8 4.3 1.1 3.8	ute Ann alues in <u>30</u> 9.4 9.6 0.4 5.4 1.6 2.8 7.8	TABLE Dual Incr Pounds	XXXVI ease in in the f <u>50</u> 8.6 8.5 1.5 6.5 0.5 2.5 2.5	II. Left Ha ollowing 60 8.7 9.4 1.5 5.5 1.5 2.7	70 9.0 10.8 0.6 6.1 3.9 0.0 0.0	eze. ntile Gra 80 7.4 10.7 1.8 5.0 4.5 -0.3 0.8	edes. 90 9.0 7.5 1.7 7.1 3.1 0.3	95 9.5 7.7 2.1 4.8 4.6 0.6	Average 10.0 6.6 3.4 3.0 2.0 2.4							
(e at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23	$ \begin{array}{r} 5 \\ 12.0 \\ 10.0 \\ 2.1 \\ 7.3 \\ -1.1 \\ 4.3 \\ -2.5 \\ 1.3 \\ \end{array} $	$ \begin{array}{r} 10 \\ 14.9 \\ 8.0 \\ 2.7 \\ 5.2 \\ 0.0 \\ 4.7 \\ -4.4 \\ 1.9 \\ \end{array} $	20 12.6 9.1 1.8 4.3 1.1 3.8 -3.7 5.2	ute Ann alues in <u>30</u> 9.4 9.6 0.4 5.4 1.6 2.8 -1.8 3.4	TABLE Description Pounds 40 7.9 9.5 0.0 6.7 1.0 2.4 -1.7 2.7		II. Left Ha ollowing 60 8.7 9.4 1.5 5.5 1.5 2.7 -0.5 0.5	70 9.0 10.8 0.6 6.1 3.9 0.0 -0.6 0.2	eze. ntile Gra 80 7.4 10.7 1.8 5.0 4.5 -0.3 0.8 -2.2	$ \begin{array}{c} 90 \\ 9.0 \\ 7.5 \\ 1.7 \\ 7.1 \\ 3.1 \\ 0.3 \\ -0.3 \\ -2.2 \end{array} $	95 9.5 7.7 2.1 4.8 4.6 0.6 -1.6 1.0	Average 10.0 6.6 3.4 3.0 2.0 2.4 -1.6 -1.1							
;e at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23	5 12.0 10.0 2.1 7.3 -1.1 4.3 -2.5 1.3	$ \begin{array}{r} 10 \\ 14.9 \\ 8.0 \\ 2.7 \\ 5.2 \\ 0.0 \\ 4.7 \\ -4.4 \\ 1.9 \\ \end{array} $	20 12.6 9.1 1.8 4.3 1.1 3.8 -3.7 5.2	ute Ann alues in <u>30</u> 9.4 9.6 0.4 5.4 1.6 2.8 -1.8 3.4	TABLE ual Incl Pounds 40 7.9 9.5 0.0 6.7 1.0 2.4 -1.7 2.7 TABLE	$\begin{array}{c} X X V 1 \\ ease in \\ \hline in the f \\ \hline 50 \\ \hline 8.6 \\ 8.5 \\ 1.5 \\ 6.5 \\ 0.5 \\ 2.5 \\ -0.7 \\ 1.2 \\ \end{array}$	II. Left Ha ollowing 60 8.7 9.4 1.5 5.5 5.5 2.7 -0.5 0.5 X.	70 9.0 10.8 0.6 6.1 3.9 0.0 -0.6 0.2	eeze. atile Gra 80 7·4 10.7 1.8 5.0 4.5 -0.3 0.8 -2.2	edes. 90 9.0 7.5 1.7 7.1 3.1 0.3 -0.3 -2.2	95 9·5 7·7 2·1 4·8 4·6 0.6 -1.6 1.0	Average 10.0 6.6 3.4 3.0 2.0 2.4 -1.6 -1.1							
re at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23 re at nearest	5 12.0 2.1 7.3 -1.1 4.3 -2.5 1.3	10 14.9 8.0 2.7 5.2 0.0 4.7 -4.4 1.9 T	$ \frac{20}{12.6} \\ 9.1 \\ 1.8 \\ 4.3 \\ 1.1 \\ 3.8 \\ -3.7 \\ 5.2 \\ he Relat $	ute Ann alues in <u>30</u> 9.4 9.6 0.4 5.4 1.6 2.8 -1.8 3.4 tive Ann lues in	PABLE Include Pounds 40 7.9 9.5 9.0 6.7 1.0 2.4 -1.7 2.7 TABLE nual Inc. Per Cen Per Cen	$\begin{array}{c} \text{XXVI}\\ \text{ease in}\\ \text{in the f}\\ \hline 50\\ \hline 8.6\\ 8.5\\ \text{i.5}\\ 6.5\\ 2.5\\ \hline 0.5\\ 2.5\\ \hline 0.7\\ 1.2\\ \end{array}$	II. Left Ha ollowing <u>60</u> 8.7 9.4 1.5 5.5 5.5 5.5 1.5 2.7 -0.5 0.5 X. Weight	70 9.0 10.8 0.6 6.1 3.9 0.0 -0.6 0.0 . (Pour . (Pour	eeze. attile Gra 80 7.4 10.7 1.8 5.0 4.5 -0.3 0.8 -2.2 ads.) mulle Gu	$\frac{90}{9.0}$ 7.5 1.7 7.1 3.1 0.3 -0.3 -2.2 rades.	95 9·5 7·7 2·1 4.8 4·6 0.6 -1.6 1.0	Average 10.0 6.6 3.4 3.0 2.0 2.4 -1.6 -1.1							
(e at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23 ;e at nearest Birthday.	5 12.0 10.0 2.1 7.3 -1.1 4.3 -2.5 1.3	$ \begin{array}{r} 10 \\ 14.9 \\ 8.0 \\ 2.7 \\ 5.2 \\ 0.0 \\ 4.7 \\ 4.7 \\ 4.7 \\ 1.9 \\ T \\ 10 \end{array} $	$ \frac{20}{12.6} \\ 9.1 \\ 1.3.8 \\ -3.7 \\ 5.2 \\ he Relat \\ Va \\ 20 $	ute Ann alues in <u>30</u> 9.4 9.6 0.4 5.4 1.6 2.8 -1.8 3.4 ive Ann lues in <u>30</u>	ABLE Aual Inc. Pounds 40 7.9 9.5 0.0 6.7 1.0 2.4 -1.7 2.4 Date 1nc. Per Cen 40	$\begin{array}{c} X X V 1 \\ ease in \\ in the f \\ \hline 50 \\ \hline 8.6 \\ 8.5 \\ 1.5 \\ 6.5 \\ 0.5 \\ 2.5 \\ -0.7 \\ 1.2 \\ \hline X X X 1 2 \\ rease in \\ t. in the \\ \hline 50 \\ \end{array}$	II. Left Ha ollowing 60 8.7 9.4 1.5 5.5 5.5 5.5 2.7 -0.5 0.5 X. Weight followin	TO 9.0 10.8 0.6 6.1 3.9 0.0 0.0 0.0 0.0 70 9.0 10.8 0.6 6.1 3.9 0.0 0.0 0.0 70	ezze. tille Gra 80 7.4 10.7 1.8 5.0 4.5 -0.3 0.8 -2.2 nds.) mtile Gra	edes. 90 9.0 7.5 1.7 7.1 0.3 -0.3 -2.2 rades. 90	95 9.5 7.7 2.1 4.8 4.6 0.6 1.0 1.0	Average 10.0 6.6 3.4 3.0 2.0 2.0 2.4 -1.6 -1.1 Average.							
re at nearest Birthday. 15-16 16-17 17-18 18-19 20-21 21-22 22-23 re at nearest Birthday. 15-16		$ \begin{array}{r} 10 \\ 14.9 \\ 8.0 \\ 2.7 \\ 5.2 \\ 0.0 \\ 4.7 \\ -4.4 \\ 1.9 \\ T \\ \hline 10 \\ 12.4 \end{array} $	$\begin{array}{c} \text{ Absol} \\ \hline \\ & V: \\ \hline 20 \\ \hline 12.6 \\ 9.1 \\ 1.8 \\ 4.3 \\ 1.1 \\ 3.8 \\ -3.7 \\ 5.2 \\ \hline \\ \text{ he Relat} \\ \hline \\ Va \\ \hline \\ \hline \\ Va \\ \hline \\ \hline \\ 10.0 \\ \hline \end{array}$	$\begin{array}{c} \text{ute Ann} \\ \text{alues in} \\ \hline 30 \\ \hline 9.4 \\ 9.6 \\ 0.4 \\ 5.4 \\ 1.6 \\ 2.8 \\ -1.8 \\ 3.4 \\ \text{ive Ann} \\ \text{lues in} \\ \hline 100 \\ 100 \\ 9.4 \\ \end{array}$	TABLE Include ual Include Pounds 40 7.9 9.5 0.0 6.7 1.0 2.4 -1.7 2.7 TABLE TABLE Per Cen 40 10.6	$\begin{array}{c} X X V 1 \\ \text{ease in} \\ \text{in the f} \\ \hline 50 \\ 8.6 \\ 8.5 \\ 1.5 \\ 6.5 \\ 0.5 \\ 2.5 \\ -0.7 \\ 1.2 \\ X X I 2 \\ \text{rease in} \\ \text{t. in the} \\ \hline 50 \\ 8.0 \\ \hline \end{array}$	II. Left Ha ollowing 60 8.7 9.4 1.5 5.5 5.5 5.5 2.7 -0.5 0.5 X. Weight followin 60 8.2	nd Sque g Percer 10.8 0.6 6.1 3.9 0.0 -0.6 0.2 . (Pour ng Percer 70 8.3	eze. tile Gra 80 7.4 10.7 1.3 5.0 4.5 -0.3 0.8 -2.2 ads.) mtile Gra 80 9.3	$\begin{array}{c} 90\\ \hline 9.0\\ 7.5\\ 1.7\\ 7.1\\ 3.1\\ 0.3\\ -0.3\\ -2.2\\ \hline 2\\ rades.\\ \hline 90\\ 9.2\\ \end{array}$	95 9.5 7.7 4.8 4.6 0.6 1.0 95 13.2	Average 10.0 0.6 3.4 3.0 2.0 2.4 -1.6 -1.1 Average. 10.3							
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(Inches. -1.2 (Inches. (Inches.</th> <th>$\begin{array}{c} \text{ades.} \\ \hline 90 \\ 9, \circ \\ 7, 5 \\ 1, 7 \\ 7, 1 \\ 0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 1 \\ 0, 3 \\ -0, 3 \\ -0, 1 \\ 0, 3 \\ -0, 1 \\ 0, 2 \\ 0, 2 \\ 0, 1 \\ 0 \\ 2, 01 \\ 2, 01 \\ 2, 02 \\ 0, 3 \\ 0 \\ 0, 72 \\$</th> <th>95 9-5 7-7 2-1 4-6 0-6 -1.6 1.0 1.0 1.0 1.2 4-6 5-1 5-3 2-0 -0-3 -3-0 -0-3 -3-0 4-9 95 1.84 1.08 4.9</th> <th>Average 10.0 6.6 3.4 3.0 2.0 2.0 2.4 -1.6 -1.1 10.3 6.0 0.7 5.0 1.1 -0.8 -1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2</th>	$\begin{array}{c} X X V I \\ \text{ease in} \\ \text{in the f} \\ \hline \\ 50 \\ 8.6 \\ 8.5 \\ 1.5 \\ 6.5 \\ 2.5 \\ 0.7 \\ 1.2 \\ 1$	II. Left Ha ollowing 60 8.7 9.4 1.5 5.5 1.5 2.7 -0.5 0.5 X. Weight followin 60 8.2 60 8.2 60 6.0 4.7 0.3 0.5 5.5 ht, Star followin 60 8.2 60 6.0 4.7 0.3 0.5 5.5 ht, Star followin 60 8.2 60 6.0 6.0 6.0 6.0 7.5 5.5 6.0 6.0 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5	nd Sque g Percer 70 9.0 10.8 0.6 1.3.9 0.0 -0.6 0.2 (Pour ng Percer 70 8.3 6.0 4.0 0.2 0.2 0 -0.6 0.2 1.1 0.2 0 -0.6 0 -0.2 0 -0.6 0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.2 0 -0.6 0 -0.2 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.2 0 -0.6 0 -0.2 0 -0.2 0 -0.6 0 -0.2 0 -0.2 0 -0.2 0 -0.6 0 -0.2 0 -0.2 0 -0.2 0 -0.6 0 -0.2 0 -0.2 0 -0.2 0 -0.6 0 -0.2 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.6 0 -0.2 0 -0.5 0 -0.2 0 -0.5 0 -0.5 0 -0.0 0 -0.2 0 -0.5 0 -0.2 0 -0.5 0 -0.0 0 -0.0 0 -0.5 0 -0.5 0 -0.5 0 -0.5 0 -0.0 0 -0.5 0 -0.0 0 -0.5 0 -0.5 0 -0.0 0 -0.5 0 -0 0 -0	eze. ntile Gr 7.4 10.7 1.3 5.0 4.5 -0.3 0.8 -2.2 ntile Gr 4.5 -0.8 -2.2 ntile Gr 80 9.3 6.8 2.3 1.8 0.6 -1.2 (Inches. ntile Gr 80 -1.2 (Inches. (Inches. -1.2 (Inches. (Inches.	$\begin{array}{c} \text{ades.} \\ \hline 90 \\ 9, \circ \\ 7, 5 \\ 1, 7 \\ 7, 1 \\ 0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 3 \\ -0, 1 \\ 0, 3 \\ -0, 3 \\ -0, 1 \\ 0, 3 \\ -0, 1 \\ 0, 2 \\ 0, 2 \\ 0, 1 \\ 0 \\ 2, 01 \\ 2, 01 \\ 2, 02 \\ 0, 3 \\ 0 \\ 0, 72 \\ $	95 9-5 7-7 2-1 4-6 0-6 -1.6 1.0 1.0 1.0 1.2 4-6 5-1 5-3 2-0 -0-3 -3-0 -0-3 -3-0 4-9 95 1.84 1.08 4.9	Average 10.0 6.6 3.4 3.0 2.0 2.0 2.4 -1.6 -1.1 10.3 6.0 0.7 5.0 1.1 -0.8 -1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2							
re at nearest Birthday. 15-16 16-17 17-18 18-19 20-21 21-22 22-23 re at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21 21-22 22-23 ge at nearest Birthday. 15-16 16-17 17-18 18-19 19-20 20-21	$ \begin{array}{r} 5 \\ 12.0 \\ 10.0 \\ 2.1 \\ 7.3 \\ -1.1 \\ 7.3 \\ -1.1 \\ 7.3 \\ -1.3 \\ -2.5 \\ 1.3 \\ -2.5 \\ 1.3 \\ -2.5 \\ 1.3 \\ -2.5 \\ 1.3 \\ -2.5 \\ -3.5 \\ -2.5 \\ -3.5 \\ -2.5 \\ -3.5 \\ -2.5 \\ -3.5 \\ -3.5 \\ -2.5 \\ -3.5 \\ $	$\begin{array}{c} 10\\ 14.9\\ 8.0\\ 2.7\\ 5.2\\ 0.0\\ 4.7\\ -4.4\\ 1.9\\ T\\ T\\ \hline \\ 10\\ \hline \\ 12.4\\ 6.7\\ 5.4\\ 3.7\\ 0.1\\ 2.53\\ 0.1\\ 0.5\\ 3.51\\ 2.53\\ 1.9!\\ 0.58\\ 0.22\\ 0.01\\ \end{array}$	ne Absol V: 20 12.6 9.1 1.8 4.3 1.1 3.8 -3.7 5.2 he Relat Va 20 7.1 6.4 3.7 1.2 0.0 7.1 6.4 3.7 1.2 0.3 0.7 1.2 0.0 7.1 6.2 0.0 7.1 6.2 0.0 7.1 6.2 0.0 7.1 6.2 0.0 7.1 1.8 8 -3.7 5.2 0 10.0 7.1 1.8 -3.7 5.2 0 10.0 7.1 1.8 -3.7 5.2 0 10.0 7.1 1.8 -3.7 5.2 0 10.0 7.1 1.8 -3.7 5.2 0 10.0 7.1 1.8 -3.7 5.2 0 10.0 7.1 1.8 -3.7 5.2 0 10.0 7.1 1.8 -3.7 5.2 0 10.0 7.1 1.8 -3.7 5.2 0 1.0 0 7.1 1.8 -3.7 5.2 0 1.0 0 7.1 1.8 -3.7 5.2 0 1.0 0 7.1 1.8 -3.7 5.2 0 1.0 0 7.1 1.8 -3.7 5.2 0 1.0 0 7.1 1.0 0 7.1 1.0 0 7.1 1.0 2.0 0 7.1 1.0 0 7.1 1.0 2.0 0 7.1 1.0 2.0 0 7.1 1.0 0 7.1 1.0 0 7.7 1.0 0 7.7 1.0 0.0 7.1 0.0 7.2 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.1 0.0 7.2 0.0 7.0 1.0 7.0 7.0 7.0 1.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7	ute Ann alues in 30 9.4 9.6 0.4 1.6 2.8 -1.8 3.4 ive Ann lues in 1 30 9.4 6.8 5.6 4.2 1.2 0.3 -1.2 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	TABLE uual Incr Pounds 40 7.9 9.5 0.00 6.7 1.0 2.7 TABLE nual Inc. Per Cen 40 10.6 5.8 5.5 4.0 10.6 5.8 5.5 4.0 0.0.4 TABLE ncrease Per Cen 2.72 1.79 0.91 0.56 0.57 0.37	$\begin{array}{c} X X V I \\ ease in \\ in the f \\ \hline 50 \\ 8.6 \\ 8.5 \\ 1.5 \\ 6.5 \\ 0.5 \\ 2.5 \\ 0.7 \\ 1.2 \\ X X I \\ rease in \\ . in the \\ \hline 50 \\ 8.0 \\ 6.7 \\ 5.6 \\ 4.0 \\ 1.1 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.3 \\ 0.8 \\ 0.3 \\ 0.8 \\ 0.3 \\ 0.8 \\ 0.3 \\ 0.8 \\ 0.3 \\ 0.8 \\ 0.3 \\ 0.8 \\ 0.3 \\ 0.8 \\ 0.3 \\ 0.8 \\ 0.0 \\ 0.0 \\ 0.$	II. Left Ha ollowing 60 8.7 9.4 1.5 5.5 1.5 1.5 2.7 -0.5 X. Weight followin 60 8.2 6.0 4.7 0.3 -0.3 -0.5 ht, Star followin 60 8.2 6.0 4.7 0.3 -0.5 ht, Star followin 60 8.2 6.0 4.7 0.3 -0.5 ht, Star followin 60 8.2 6.0 4.7 0.3 -0.5 ht, Star followin 60 8.2 6.0 4.7 0.3 -0.5 ht, Star followin 60 8.2 6.0 4.7 0.3 -0.5 ht, Star followin 60 8.2 6.0 4.7 0.3 -0.5 ht, Star followin 60 8.2 6.0 4.7 0.3 -0.5 ht, Star followin 60 8.2 6.0 6.0 4.7 0.3 -0.5 ht, Star followin 60 8.2 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0	rod Squee g Percer g 0.6 g.0 10.8 10.8 0.6 0.9 0.0 0.0 0.6 0.2 0 . (Pour ng Percee 70 8.3 6.0 6.0 4.0 1.1 0.2 odding. 1.4 ng Percee 70 2.41 1.71 0.34 0.47	eze. htile Gr 7.4 10.7 1.8 5.0 4.5 -0.3 -2.2 hds.) htile Gr 80 9.3 6.0 0.3 6.0 0.3 6.0 -1.2 (Inches. htile Gr 2.14 1.64 0.37 0.68 -1.2 (Inches. (Inches. -1.2 (Inches. (Inches.	$\begin{array}{c} \text{ades.} \\ \hline 90 \\ 90 \\ 7.5 \\ 1.7 \\ 7.1 \\ 3.1 \\ 0.3 \\ -2.2 \\ \hline 300 \\ 90 \\ 9.2 \\ 6.0 \\ 7.4 \\ 4.0 \\ 2.1 \\ -0.1 \\ -0.5 \\ 2.7 \\ 0.4 \\ 1 \\ -0.1 \\ 0.5 \\ 2.7 \\ 0.4 \\ 1 \\ 0.0 \\ 0.72 \\ 0.41 \\ 0 \\ 0.72 \\ 0.41 \\ 0 \\ 0.72 \\ 0.41 \\ 0 \\ 0.72 \\ 0.41 \\ 0 \\ 0.72 \\ 0.41 \\ 0 \\ 0.72 \\ 0.41 \\ 0 \\ 0.72 \\ 0.41 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ $	$ \begin{array}{r} 95\\ 9.5\\ 7.7\\ 2.1\\ 8\\ 4.6\\ 0.6\\ \hline 1.6\\ 1.0\\ \hline 13.2\\ 4.6\\ 5.1\\ 5.3\\ 2.0\\ \hline -0.3\\ -3.0\\ \hline -0.3\\ -3.0\\ \hline 4.9\\ \hline 95\\ 1.84\\ 1.08\\ 0.31\\ \hline 0.52\\ 0.35\\ \hline 0.175\\ \hline \end{array} $	Average 10.0 6.6 3.4 3.0 2.0 2.0 2.0 2.0 2.0 2.0 1.1 10.3 6.0 6.7 5.0 1.1 -0.8 -1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2							
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THE GROWTH OF U. S. NAVAL CADETS.

TABLE XLI.

The Relative Annual Increase in Height, Sitting. (Inches.)

Age at nearest		Values in Per Cent. at the following Percentile Grades.													
Birthday.	5	10	20	30	40	50	60	70	80	90	95	Average			
16-17	2.87	2.40	2.44	2.30	2.17	2.04	1.82	1.61	1.68	1.95	1.95	1.50			
17-18	2.60	2.21	1.30	1.30	1.27	1.21	1.43	0.64	1.25	0.78	1.30	2.14			
18-19	0.38	0.44	0.95	1.08	1.18	1.18	0.93	1.58	0.59	1.08	0.69	2.10			
19-20	0.37	0.00	0.71	0.70	0.75	0.52	0.52	0.50	0.68	0.68	0.41	2.00			
20-21	1.25	1.55	1.11	1.21	0.09	0.53	0.39	0.27	0.29	-0.08	-0.27	-0.62			
21-22	-1.05	-1.20	-0.90	-0.90	-0.48	-0.35	-0.21	-0.08	0.20	0.08	1.40	0.00			
22-20	2.10	1.00	0.02	0.17	0.07	0.03	0.13	0.23	[—0.02	-0.77	1.08	0.00			

TABLE XLII.

The Relative Annual Increase in Perineal Height. (Inches.)

Age at nearest		Values in Per Cent. at the following Percentile Grades.														
Birthday.	5	10	20	30	40 [50	60	70	80	90	95	Average				
15-16	5.00	0.70	2.26	2.71	2.30	2.20	2.33	2.44	2.05	1.83	2.36	3.80				
16 - 17	2.81	4.10	2.16	2.38	2.41	2.32	2.24	2.24	3.02	2.20	1.70	2.41				
17-18	1.22	1.62	1.51	1.41	1.24	1.20	1.05	0.90	0.30	0.72	0.84	1.77				
18-19	1.54	1.00	1.01	0.74	0.48	0.69	0.58	0.47	0.64	0.30	0.70	3.76				
19-20	0.46	0.55	0.26	0.26	0.58	0.19	0,10	0.55	0.30	0.24	0.46	-2.50				
20-21	-0.40	-0.33	-0.09	-0.027	0.020	0.04	0.103	-0.10	0.06	0.003	-0.07	-1.459				
21-22	0.06	0.89	0.47	0.57	0.47	0.42	0.39	0.61	0.82	1.46	0.64	2.77				
22-23	0.61	0.88	0.64	0.66	0.50	0.45	0.42	0.90	-0.22	-0.90	-0.89	0.00				

TABLE XLIII.

The Relative Annual Increase in Circumference of Chest. (Inches.)

A

Age at nearest Values in Per Cent. at the following Percentile Grades. Birthday. 5 10 20 30 40 50 60 7080 90 95 Average 15-16 16-17 17-18 18-19 19-20 20-21 21-22 4.50 3.12 2.37 1.78 0.80 3.77 2.50 2.44 1.70 0.96 3.82 4 · 54 2 · 39 3 · 96 2 · 34 3.93 2.23 4.36 2.13 4.14 3.62 2.90 2.06 4.21 2.82 3.62 3.40 3·37 2.23 3.77 3.83 2.97 3.09 1.14 0.67 2.90 2.45 2.50 2.70 2.97 1.72 0.85 0.16 1.70 1.14 0.40 0.90 0.75 0.57 0.40 0.91 0.92 1.52 2.00 0.21 0.23 0.37 0.06 0.30 0.20 0.30 0.09 0.30 0.00 0.56 0.47 0.23 0.47 0.30 0.52 0.21 0.36 0.44 0.16 0.30 0.23 0.02 0.36 22-23 0.28 0.07 0.01 -0.25 0.15 1.40 0.45 0.10

	The Relative Annual Increase in Lung Capacity. (Co. Inches.)														
Age at nearest	Values in Per Cent. at the following Percentile Grades.														
Birthday.	5	10	20	30	40	50	60	70	80	90	95	Average			
15-16	14.2	10.1	11.0	0,11	11.0	8.3	5.1	6.4	10.1	9.5	11.0	10.0			
16-17	6.5	7.5	9.4	8.1	6.4	7.6	8.6	8.9	7.3	7.8	4.7	8.0			
17-18	6.6	4.8	4.I	5.0	6.3	4.7	5.0	4.0	3.2	3.3	4.2	4.X			
18-19	4.8	4.8	5.4	4.3	3.7	4.1	3.5	3.3	3.3	3.8	0.0	0.2			
19-20	1.9	1.5	0.8	1.1	1.3	2.5	2.7	2.2	3.3	3.8	1.0	-0.4			
20-21	0.04	0.04	0.12	1.00	0.04	0.00	-0.83	-0.54	-0.04	-0.43	-I.34	0.04			
21-22	3.40	3.11	3.05	0.03	2,90	2.37	2.37	2.01	2.00	7.39	4.00	2,00			
22-23	0.201	-1.22	0.24	-0.001	-0.45	-0.00	-0.20	0.20	0.321	-4.201	-5.29	-1.04			
		P C													

TABLE XLV.									
The Relative Annual Increase in Circumference of Waist.	(lnches.)								

Age at nearest		Values in Per Cent. at the following Percentile Grades.														
Birthday.	5	10	20	30	40	50	60	70	80	90	95	Average				
15-16	6.21	4.30	3.86	3.86	3.15	2.35	2.35	3.15	3.50	1.50	0.75	3.63				
16 - 17	2.35	2.42	2.54	2.00	2.27	2.64	2.77	2.77	2.50	3.11	2.64	5.23				
17-18	1.34	1.75	2.04	2.59	2.73	2.81	2.92	2.90	2.30	3.28	2.81	2.00				
18-19	0.43	1.22	1.22	1.11	1.43	1.36	1.25	1.11	1.54	0.50	0.80	1.08				
19-20	1.23	0.42	0.56	0.80	0.59	1.33	0.73	1.50	2.00	3.00	2.62	0.07				
20-21	-0.35	-0.31	-0.42	-0.60	-0.39	-1.01	-0.17	0.07	0.14	-0.42	-0.73	0.21				
21 - 22	1.77	1.04	0.60	0.34	0.24	0.42	0.49	0.21	0.55	-1.01	-0.66	0.41				
22-23	-0.76	0.00	0.55	0.93	0.62	0.28	0.45	0.76	1.32	1.73	2.42	1.40				

TABLE XLIV.

			The Relative Annual Increase in Span of Arms. (Inches.)												
e at	neare	st				Va	lues in	Per Cer	t. at the	followin	ng Perce	ntile G	rades.		
Birt	hday.	_ 1	5	1	0 2	20	30	40	50	60	70	80	90	95	Average.
1	5-16		0.39	2.	11 3	. 15	3.86	3.58	3.60	3.86	4.10	2.38	2.97	4.76	5.37
	6-17 7-18		4 04	2.	40 1	•78 61	1.71	1.51	1.03	1.03	1.04	1.79	1.80	1.00	1,14
	8-19	-	-0.02		62 1	.06	0.66	0.62	0.67	0.61	0.85	0.70	0.46	0.79	1.15
1	9-20		0.61	0	67 0	•35	0.52	0.51	0.52	0.68	0.95	0.67	1.19	0.35	-0.03
2	0-21		0. 60		28 I	. 38	1.34	1.05	0.75	0.74	0.35	0,20	0.00	1.17	0.81
2	1-22 2-23	-	-1.70		45 -1	.30	-1.21	1-0.70	-0.40	0.25	-0.12	-0.61	-1.25	-0.82	-0.00
-	N NO		4.20					TARL	XIVI	I					
				The	Relativ	e Ar	nnual I	ncrease	n Right	Hand S	queeze.	(Poun	ds.)		
je at	neare	st				Va	lues in	Per Cer	t. at the	followin	ng Perce	ntile G	rades.		
Birt	hday.	_ []	5	_[_1	0 2	20	30	40	50	60	70	80	90~	95	Average.
1	5-16		21.3	24	.4 2	0.8	15.0	10.8	13.1	11.0	9.0	10.6	5.1	16.4	17.2
1	7-18		0.5		5.4	2.4	0.5	2.6	3.00	2.7	2.7	10.3	* 10.2	5.0	0.3
1	8-19		3.5		3.8	5.7	6.8	5.3	5.5	6.3	6.2	6.2	7.3	7.0	5.0
1	9-20		0.7	, i	.0	2.4	2.2	1.7	2.1	1.8	2.0	4.2	1.6	1.4	2.3
20	0-21		1.0			1.0	2.1	2.7	2.3	3.1	3.3	1.7	3.5	3.8	1.1
2	2-23		3.3		1.2	3•5 7•3	7.8	5.9	4.6	5.8	7.4	3.7	0.9	2.4	0.1
		i		The	Relati	ve A	.nnual	TABLE Increase	XLVII in Left	I. Hand So	queeze.	(Pound	ls.)		
geat	neare	st				Va	lues in	Per Cen	t. at the	followin	ng Perce	ntile G	rades.		
Birt	hday.	_ []	5	1_1	0 2	20	30	40	50	60	70	80	90	95	Average.
1	5-16		20.0	25	.0 2	1.0	16.0	13.1	14.3	14.5	15.0	12.3	15.0	15.1	16.6
1	7-18		14.3		•4 1	3.0	13.7	13.5	2.0	2.0	15.4	2.3	2.2	2.7	4.4
ī	8-19		9.1	6	•5	5.4	6.7	8.4	8.1	7.0	7.6	6.2	8.8	6.0	3.8
1	9-20		-1.3		0.0	1.3	1.9	1.2	0.6	1.8	4.7	5.4	3.8	5.5	2.4
2	1-22		-2.8		.0 -	4.4	3.3	2.0	-0.8	3.2	-0.7	-0.3	0.3	-1.8	-1.8
2	2-23														
	_		1.5	<u> </u>		5.0	4.0	3.1	1.4	0.6	-0.2	-2.5	-2.5	1,2	-1.3
			1.5	<u> </u>		TA	BLE X	LIX. 1	he Heig	o.6 ght, Star	0.2	-2.5	-2.5	1,2	-1.3
	rest	ns.	ut.		0	TA:	8LE X		he Heig	ght, Star	0.2	-2.5	-2.5	1.2	-1.3
	carest day.	of ations.	: of ment.	i z	r of	TAI	BLE X	LIX. I	P.I.	sht, Star	-0.2 nding.	-2.5	-2.5	I.2	-1.3
	t nearest thday.	lo. of rvations.	nit of urement.	erage.	obable rror of	TAI	obable viation. 719 X 719	ation of able De- tion to erage.	solute Increase verage.	Increase '140'	25 centile rade	dian or	75 75 centile	edian 5.1	-1.3
	e at nearest Birthday.	No. of oservations.	Unit of asurement.	Average.	Probable Error of		Probable Deviation. X 0.1	celation of T obable De- X viation to	Absolute n'l Increase Average.	Relative '14' n'l Increase '14' Average.	²⁵ bercentile Grade.	Aedian or Percentile	orade. 75 ercentile	Median Ninus	-1.3
	Age at nearest Birthday.	No. of Observations.	Unit of Measurement.	Average.	Probable Error of Average		Deviation.	Relation of Probable De-X viation to Average.	Absolute Ann'l Increase of Average.	Relative '14' Ann'l Increase '5' of Average.	Percentile Gradetile	Median or 50 Percentile	Percentile	Median Minus	-1.3
	Age at nearest Birthday.	No. of Observations.	Unit of Measurement.	Average.	Probable B Error of Average		Probable Brobable X HI	Probable De- Nation to Average.	Absolute Ann'l Increase of Average.	Relative 't' Ann'l Increase So	Percentile	Median or 50 Percentile	Percentile	Minus 7:1	-1.3
	Age at nearest Birthday.	Deservations.	Measurement.	Average.	Probable Probable Bui B Error of Average		Deviation.	Relation of Probable De- Nation to Average.	Absolute Ann'l Increase of Average.	Relative '144 Ann'l Increase '190 of Average. 120	Dercentile	2.5 Median or 50 Percentile	2200 Urade. 2200 Percentile	0 % Grade. + Median Minus	-1.3
	Age at nearest Birthday.	266 the No. of Observations.	Unit of Measurement.	Average.	Probable Probable Bror of Average		т.т.т. Probable 996 р. Deviation. X ята	Netrade. L. Station of Relation of Netrade. L. Station to P./P Average. L. Station to Average.	Absolute Absolute Absolute of Average.	2.1. Relative Mnn1Increase of Average.	-0.2 nding. Bercentile 62.051 64.144 65.50	2.5 Median or 50 Percentile	0000 Urade. 0000 Urade. 0000 Percentile	80 80 90 0rade.	-1.3 WAALTANGE
	Age at nearest Birthday.	No. of No. of Observations.	Measurement.	Average.	Probable Probable Froo 22		200 000 Deviation. X ята	Relation of Relation of <i>P</i> / <i>P</i> <i>P</i> / <i>P</i> /	Absolute Ann'l Increase of Average.	9.0 0.1.1 0.1.1 0.1 0.1 0.1 0.1 0.	62.050 62.050 64.144 65.500 66.184	2.5 2.5 Wedian or 2.6 2.6 2.6 2.6 2.6 2.6 2.6 2.6 2.6 2.6	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	72 80 0 80 0 67 2006. + + Median . 0 0 0 0 0 0 0 0 Minus	1.3
	65 861 861 861 861 861 861 861 861 862 862 862 862 862 862 862 862 862 862	0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Unit of Measurement.	Average.	Probable Probable Brrobable Brrobable Averace		2000 000 000 000 000 000 000 000 000 00	Relation of Relation of Relation of Relation of No. 2000 V viation to No. 2000 V VIAtion	Absolute Absolute Absolute Ann'l Increase of Average.	Ann'l Increase State of Average.		2.5 	0.00 12 22 22 22 22 22 22 22 22 22 22 22 22	71 200 200 200 200 200 200 200 200 200 20	-1.3
	Rest at nearest Birthday.	00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 00	Unit of Measurement.	Average.	Probable Probable Probable Brrobable Average		7 1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	1.4 he Heig Apsolute Appolute Ap	0 of Average.		2.5 	Clade. Clade.	71 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
	22 T Birthday.	866 902 826 1 No. of 005 1 2 2 2 0 1 2 2 6 1 005 01 2 2 0 1 2 2 0 1 2 0 005 00 1 005 005 005 005 005 005 005	Unit of Measurement.	Average.	Probable Probable Probable Probable Bernage		22.1.1.1.1.1.2. Probable 7.1.1.1.1.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.	2.11 3.1 3.1 3.1 3.1 3.1 3.1 3.1	1.4 he Heig Psolnte 4 psolnte 4 psolnte 4 psolnte 4 psolnte 4 psolnte 4 psolnte 4 psolnte 4 psolnte 5 0 psolnte	0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021 0.021		2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	Clade. Clade.	0 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
	R 27 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	222 232 252 252 252 252 252 252 252 252	Unit of Measurement.	Average.	Probable Probable Probable Brobab		X article Probable X arts 056 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3.1 3.1 7 8 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8	Absolute Absolu	o.0 Relative Relative 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.		-2.5 -2.5	Crade: Crade:	0000 0000 0000 0000 0000 0000 0000 0000 0000	-1.3
	t 872 872 872 872 872 872 872 872 872 872	No. of No. of No. of Observations.	Unit of Measurement.	Average.	Probable Probab		L. 50 Deviation. Probable Deviation. Deviation. Deviation. Deviation. Deviation.	1.1. 1.1.	1.4 he Heig 92010 2.13 1.12 0.24 0.61 0.65 0.15 0.17 The W	0.0 Sht, Star Star, Star Belative Belative 3.34% 1.70 0.35 0.91 0.95 0.215 0.248 eight. 9		2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	Clade: Clade:	0001155 + 28 80 80 01155 + 28 80 010155 + 28 80 01155 + 28 80 011	-1.3
	rest 878786841994 Age at nearest 878786841994	005. 005. 005. 005. 005. 005. 005. 005.	ent. Unit of Measurement.	Average.	Probable Probab		T A A C A C A C A C A C A C A C A C A C	00 00 01 02 02 02 02 02 02 02 02 02 02	1.4 he Heig Appendix Appendix 9,000 1,12 1,12 0,01 1,12 0,01 0,17 The W 1,000 1,17 0,17 1,12 0,12 0,12 0,17 0,17 0,17 0,17 0,17 0,17 0,17 0,17	ease lig ease lig eas		rite 10 10 10 10 10 10 10 10 10 10	10 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	21.1 21.1	-1.3
	nearest Rest Rest Reat nearest Birthday.	of 2565 942 81 000 01 2805 90 1 256 10 00 05 00 05 00 1 20 05 00 05 00 00 00 00 00 00 00 00 00 00	t of Unit of Measurement.	age. 4	able r of Probable Brobable Brobable Brobable Average		ttion. T A 200 C C C C C C C C C C C C C C C C C C C	00001 01001 0100 000 0100 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 00000	1.4 be Heig be to 1.4 he Heig be to 1.4 he Heig be to 1.4 Vulletease to 2.1 he Vulletease to 2.1 he W to 1.1 he W to 1.0 he W	lute e in corease in corease in arge. 1400 0000 1000 1000 1000 1000 1000 100	4 1 2 2 0 - 2 2 0 - 2 0	antite data de la construction	de. 25 25 25 25 25 25 25 25 25 25 25 25 25	ian 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-1.3
	at nearest 888 286 849 551 Age at nearest 888 286 849551 Birthday.	Vo. of No. of No. of No. of No. of No. of Strations.	nit of Unit of Measurement.	erage. • • • • • • • • • • • • • • • • • • •	obable Probable Proba		viation. X arra Vation. X arra X arra V A arra V A arra V A arra V A arra V A arra	ation of the provided of the provided p	aratom of rarge to to to to the solution of Absolutes and and rarge to to the solute of the solute of Ann'l Increase. Ann'l Increase. and ing. Ann'l Increase. of Average. of Average.	ssolute	Increase verage. 25 25 25 25 25 25 25 25 25 25	recenture reade. 25 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20	riade. 25 5 5 7 5 8 9 0 0 0 0 1 1 2 0 0 0 1 1 2 0 0 0 0 0 0 0	raue. 001464 58 80 80 Grade. edian 01111 + 1 + 1 + Median 1111.	-1.3
	Se at nearest Birthday. 28828652455 Birthday.	No. of No	Unit of Unit of Easurement.	Average. Average. Average. Average. Average. Average.	Probable Error of Average.		Deviation. X Deviation. X Hara	Average. T 2010 01 01 01 01 01 01 01 01 01 01 01 01	Vertation of Vertage to U Height, aut 0.00000000 Height, aut 0.0000000000 Ann'l Increase. Standing, Ann'l Increase. Standing, of Average.	Absolute in Albourde in Albour	In'l Increase Average. 1 Average. 1 Ave	Grade. Median or Solution Percentile \$	Grade. Grade. 0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Median 0 0 1 0 + 1 × 1 8 80 8 0 rade. Median 1 1 1 + 1 + 1 Median Minus. 0 0 0 0 0 0 0 0 0 0 0 0	-1.3
	Age at nearest Birthday.	No. of No. of No. No. of No. of No. of No. of No. of No. of No. of Nof	Unit of Unit of Measurement.	Average. Average. Average. Average. Average.	Probable Error of Average. Average. Average. Average.		Deviation. Deviation. X 10 25.1.1.1.2 25.1.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2 25.1.2	A retation of a state of the st	Average to H Average to H Meright, auto Standing, M. 2510000 Average. of Average.	Absolute in Absolu	Ann'l Increase of Average. of	Tercentic Prede Carade Median or 888999255994 460 88 Median or 88999955599 86 86 Operation 88 89 89 86 Operation 88 89 89 86 86 Operation 88 89 89 89 89 86 <td< td=""><td>Grade. 58 85 85 45 88 00 00 56 85 45 89 00 56 85 45 89 00 56 85 45 89 00 57 75 75 Percentile 008 86 96 95 99 99 99 99 75 95 75 95 75 100 100 100 100 1</td><td>Median Median Median Median Minus. 0.00000000000000000000000000000000000</td><td>-1.3 </td></td<>	Grade. 58 85 85 45 88 00 00 56 85 45 89 00 56 85 45 89 00 56 85 45 89 00 57 75 75 Percentile 008 86 96 95 99 99 99 99 75 95 75 95 75 100 100 100 100 1	Median Median Median Median Minus. 0.00000000000000000000000000000000000	-1.3
	년 Age at nearest 23282864고도도 Age at nearest 257282845555	No. of No. of No. of No. of No. servations. No. of No. of No. of	Unit of Unit of Measurement.	Average. Average. Average. 0.201	Probable Berror of 00000000000000000000000000000000		Deviation. Deviation. Deviation. T V T V T V T V T V T V T V T V	W/P Profation of V/P Probable Do- A viation to 2000 V/P Probable De- 2000 Viation to 2000 V/P Probable De- 2000 Viation to 2000 V/P Probable De- 2000 Viation to 2000 V/P Viation to Average.	Average to Average. Absolute Average. And Average and Average to Average to Average. Ann'l Increase. Ann'l Increase. Ann'l Increase. Ann'l Increase. Average. Ann'l Increase. Average.	Absolute Ann'lIncrease of Averase r b b b b b b b b b b b b b b b b b b	Ann'l Increase of Average. of	Crede. Median or so Percentile Serve 20, 20, 20, 20, 20, 20, 20, 20, 20, 20,	Percentile 55 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Median Median Median Median Median Naue	-1.3
	Age at nearest 888년6년 14년 4월 inthday. 888년 881년 881년 14년 1891년	66 I No. of 100. of 100. 00 100. 00	Measurement. Measurement.	0.201 Average. Average. Average. Average. Average.	Probable Probable Error of 0.00000000000000000000000000000000000		Construction of the second sec	6.80 / P Probable De- 9.00 / P Probable De- 9.00 / Probable De- 9.00 / Valion to 1.00 / Valion to	1.4 Meration of Average to Height	0 Absolute 0 0 Ann'l Increase 0 0 of Average 74	Of Ann'l Increase as 0 of Average 35 0 of Average 36 0 of Average 37	Tercentite Openetitie Openeti	Gir Grade. 255555550 0 0rade. 2555555555555555555555555555555555555	800 Uraue. 1+ Median + + Median Median Minus.	-1.3
	1 2년39년 Birthday. 823128663년3년 Birthday.	258 I Observations. [2 865 954 826 1 005 01 005 01 200 005 01 200 01 200 00 01 200 00 00 00 00 00 00 00 00 00 00 00 00	Measurement. Measurement.	Average. Averag	Probable Probable Probable Probable Probable Probable Average. Average.		Co co co p Probable 2000 protection 2000 probable 2000 protection 2000 protect	66 80 001 Probable Do- NPP Probable Do- 87 V vialion to 81 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Average to Horizon of Average. Average to Horizon of Average. Ann'l Increase Standing. Ann'l Increase of Average.	Absolute o Absolute o Absolute o Ann'l Increase provide o o o o o o o o o o o o o o o o o o o	0.00 0.00	Tercentite Tercentite Median or Secondaria Secondar	Crade. Grade. Grade. Grade. Grade. Grade. Crade. Cr	0 889 0 1440. 00 1454 5 80 0 80 0 1440. 0 144 14 14 14 14 14 14 14 14 14 14 14 14	-1.3 -1.3
	Birthday. 83831066841	2 82.6 EL No. of 25.8 64 95.4 82.6 EL No. of 25.8 82.6 92.4 82.6 EL Observations. 25.8 82.6 92.9 24.8 005.6 Frvations.	Measurement. Measurement.	Average. Ave	Probable Probable Probable Probable Probable Probable Probable Average. Average.		282160 Periation 287160 Periation 287160 Periation T. 12212 287160 Periation T. 12212 T. 1	Average. 1 12 Average. 1 12 Averag	Average. 10 Average. 10 Avera	Absolute A 9.82.11 Ansolute 1.900 Anillarcease 1.100 Anilarcease	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	66: 67: 67: 67: 67: 67: 67: 67:	75 6 75 55 55 55 75 175 6 60 55 <td>1 + Median 00000 0100 0000 010000 01000 01000000</td> <td>-1.3 </td>	1 + Median 00000 0100 0000 010000 01000 01000000	-1.3
	Age at nearest Exception Age at nearest 026201 Birthday. Exception Birthday.	2602 824 81 No. of No.	Unit of Measurement. Measurement.	Average. Averag	10000000000000000000000000000000000000		Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Deviation: Dev	Contraction of the second seco	Netation of Averation of Average. Abel Abel Abel Abel Abel Abel Abel Abel	Absolute n Absolute n 1:9.9.0.1 Ann'llacrease 1	Ann'l Increase of Ann'l Increase of Average. of Averag	Tercentie Crade. Median or 0	Percentile Set 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	001000000 01201 001101 00000 01201 00000 012000 012000 012000 012000 012000 012000 012000 012000 012000 012000 012000 012000 012000 01200000000	-1.3
	[프장보고그리다] Age at nearest [23828년 814 Age at nearest] 28828년 814 Age at nearest]	64 92 82 82 82 1 No. of	Measurement. Measurement.	Average. 4. verage. 4. verag	Probable Probable 912600 000000000000000000000000000000000000		Periodations Pe	Xetation of biol Ketation of the set Ketation of the set Ketation of the set Ketation of the set Ketation of the set Ketation of the set I set 2.5	1.4 he Height Areaton of Areaton of Are	Absolute Biolute <	Ann'l Increase a construction of Average. a construction of Average. a construction of Average. b construction of Average. b construction of Average. construction of Av	Cracentie Cracentie <thcracentie< th=""> Cracentie <thcracentie< th=""> Cracentie <thcracentie< th=""> <thcracentie< th=""> <thcra< td=""><td>61 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td>0 900 00 000 0 7406 + 586 0 80 0 7406 - 1 1</td><td>-1.3 -1.3 </td></thcra<></thcracentie<></thcracentie<></thcracentie<></thcracentie<>	61 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 900 00 000 0 7406 + 586 0 80 0 7406 - 1 1	-1.3 -1.3
	28212825444944 Age at nearest 82812866844954 Birthday.	2866 902 8228 1 No. of 2866 902 826 1 No. of 05864 902 826 1 Observations. 2866 902 826 1 Observations.	Measurement. Measurement.	Average. Ave	Probable Pro		4.0 X BLE X Deviation 1.1.56 1.1.50 1.1.550 1.1.51 TA Deviation 2.2.59 2.59	× 2.2, 9.2, 1.2, 2.2, 9.2, 2.4, 2.4, 2.4, 2.4, 2.4, 2.4, 2.4, 2	Average. Average. Absolute Average to 1.1 Average to 1.2 Average to 2.0 Average. Standing. And Absolute Average. Standing. Ann'l Increase. Standing. Average.	Absolute a Absolute a w v v v v w v v v v v v v v v v v v v v v v v v v	Ann'l Increase a c c c c c c c c c c c c c c c c c c c	Creating	Crade. Crade.	Open color Open co	-1.3 -1.3

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Age at nearest Birthday.	No. of Observations.	Unit of Measurement.	Average.	Probable Error of Average.	Probable Deviation.	Probable De-	Relation of Average to Height, Standing.	Absolute Ann'l Increase of Average.	Relative Ann'l Increase of Average.	25 Percentile Grade.	Median or 50 Percentile Grade.	75 Percentile Grade.	Median Minus Average.
$15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 23 \\ 15 \\ 15 \\ 15 \\ 16 \\ 16 \\ 16 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 23 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 1$	131 395 722 841 750 695 493 328 232		33.3 34.5 35.0 35.7 36.5 35.7 36.0 36.0 36.0	$ \begin{array}{c} \pm 0.088 \\ \pm 0.048 \\ \pm 0.032 \\ \pm 0.027 \\ \pm 0.027 \\ \pm 0.027 \\ \pm 0.024 \\ \pm 0.040 \\ \pm 0.036 \\ \end{array} $	$ \begin{array}{c} $	3.03% 2.80 2.46 2.27 2.70 1.96 1.50 2.05 1.58	42.7% 52.3 52.5 53.0 53.7 52.1 52.4 52.5 52.4	0.50 0.75 0.75 0.73 -0.23 0.00 0.00	1.50% 2.14 2.10 2.00 	32.481 33.271 33.735 34.098 34.356 34.772 34.450 34.593	33.500 34.180 34.630 35.055 35.254 35.445 35.320 35.333	34.2 ⁸ 2 35.030 35.360 35.749 35.967 36.064 36.087 36.123	-1.000 -0.820 -1.120 -1.445 -0.516 -0.555 -0.680 -0.667
					TAB	LE LII.	The P	erineal I	Height.				
Age at nearest Birthday.	No. of Observations.	Unit of Measurement.	Average.	Probable Error of Average.	Probable Deviation.	A Probable De- viation to Average.	Kelation of Average to Height. Standing.	A bsolute Ann'i Increase of Average.	Relative Ann'l Increase of Average.	²⁵ Percentile Grade.	Median or 50 Percentile Grade.	Percentile Grade.	Median Minus Average.
15 16 17 18 19 20 21 22 23	131 395 722 841 750 695 493 328 232		32.0 33.2 34.0 34.6 35.9 35.0 34.0 35.0 35.0	$ \begin{array}{c} + & & & & \\ + & & & & & \\ + & & & & & \\ + & & & & & & $	$ \begin{array}{c} \pm 1.51 \\ \pm 1.29 \\ \pm 1.25 \\ \pm 1.22 \\ \pm 0.86 \\ \pm 0.98 \\ \pm 1.69 \\ \pm 1.14 \\ \pm 1.12 \end{array} $	4.72% 3.89 3.67 3.52 2.40 2.80 4.97 3.20 3.20	50.1% 53.5 50.7 51.4 52.8 51.1 50.0 51.1 51.0	1.20 0.80 0.60 1.30 -0.90 -1.00 1.00 0.00	3.8% 2.41 1.77 3.76 2.50 -1.46 2.77 0.00	31.882 32.678 33.531 34.030 34.338 34.431 34.390 34.574 34.803	33.125 33.830 34.600 35.007 45.243 35.310 35.310 35.492 35.654	34.168 34.887 35.761 35.909 36.102 36.256 36.241 36.500 36.617	
					TABLE 1	LIII. T	he Circu	mferenc	e of Che	st.			
Age at nearest Birthday.	No. of Observations.	Unit of Measurement.	Average.	Probable Error of Average	Probable Deviation.	Relation of Probable De- viation to	Relation of Average to Height,	Absolute Ann'l Increase of Average.	Relative Ann'l Increase of Average.	²⁵ Percentile Grade.	Median or 50 Percentile Grade.	75 Percentile Grade,	Median Minus Average.
15166177188192002122223	132 395 722 841 750 695 493 328 232		30. 31. 32. 33. 35. 34. 34. 34. 34.	$ \begin{array}{c} E \\ 50 \pm 0.12 \\ 50 \pm 0.04 \\ 50 \pm 0.04 \\ 46 \pm 0.04 \\ 30 \pm 0.03 \\ 30 \pm 0.04 \\ 30 \pm 0.05 \\ 35 \pm 0.06 \\ 80 \pm 0.07 \\ $	$\begin{array}{c} d \\ 3 \\ +1.43 \\ 5 \\ +1.33 \\ 4 \\ +1.26 \\ 3 \\ +1.26 \\ 8 \\ +1.04 \\ 5 \\ +1.16 \\ 5 \\ +1.16 \\ 5 \\ +1.26 \\ +1.26 \end{array}$	a/A 4.65% 3.78 3.50 3.50 3.55 3.40 3.43 3.43 3.45	A/H 47.8 48.0 48.5 49.7 51.5 50.3 50.0 51.8 50.7	1.17 0.83 0.94 1.54 -0.70 0.00 0.05 0.45	3.83% 2.62 2.00 4.60 -2.00 0.00 0.02 1.40	28.385 29.707 30.770 31.577 32.210 32.426 32.500 32.642 32.751	29.952 31.101 3.895 32.685 33.250 33.588 33.656 33.776 33.873	31.363 32.356 33.034 34.034 34.459 34.459 34.724 34.803 34.891 31.850	-0.548 -0.569 -0.605 -0.775 -1.756 -0.712 -0.644 -0.574 -0.927
					TAI	BLE LIV	. The I	Jung Ca	pacity.				
Age at nearest Birthday.	No. of Observations.	Unit of Measurement.	Average.	Probable Error of Average.	Probable Deviation.	Relation of Probable De- viation to	Relation of Average to Height,	Absolute Ann'l Increase of Average.	Relative Ann'l Increase of Average.	25 Percentile Grade.	Median or 50 Percentile Grade.	Percentile Grade.	Median Minus Average,
$15\\16\\17\\18\\20\\21\\22\\23$	1 32 395 722 841 750 675 483 328 2 328		183 395 722 841 750 675 493 328 232		$ \begin{array}{c} d \\ \pm 26.10 \\ \pm 21.69 \\ \pm 22.00 \\ \pm 22.87 \\ \pm 19.60 \\ \pm 21.19 \\ \pm 20.84 \\ \pm 20.83 \\ \pm 16.05 \end{array} $	d/A 14.2% 10.8 10.1 10.1 8.2 8.8 8.6 8.5 7.9	A/H 40.9 32.9 33.0 28.8 30.2 30.4 27.8	18.0 16.0 9.0 14.0 -1.0 2.0 5.0 -4.0	10.0% 8.0 4.1 6.2 	152-4 176-5 187-3 197-9 208-2 211-3 213-2 218-5 216-2	178.2 193 5 208.8 219 0 228.3 233.2 232.2 237.9 236.3	202.2 217.8 233.6 240.8 248.2 255.3 255.3 253.6 259.2 259.8	$ \begin{array}{r} -4.8 \\ -7.5 \\ -8.2 \\ -7.0 \\ -11.7 \\ -5.8 \\ -8.8 \\ -8.1 \\ -5.7 \\ \end{array} $

TABLE LI. The Height, Sitting.

THE GROWTH OF U. S. NAVAL CADETS.

Age at nearest Birthday. No. of	Observations. Unit of Measurement.	Average.	Probable by Error of Average.	R. Probable Deviation.	Relation of Probable De- Viation to Average.	H/V Relation of Average to Height, Standing.	Absolute Ann'l Increase of Average.	Relative Ann'l Increase of Average.	Percentile Grade.	Median or 50 Percentile Grade.	75 Percentile Grade.	Median Minus Average.
15	1 32	25.09	±0.095	11.09	4.34%	3.93			23.79	25.12	26.23	+ 0.0
16 :	395	26.00	±0.052	±1.03	4.00	3.94	0.91	3.63%	24.76	25.77	27.01	- 0.2
17	722	27.36	+0.042	±1.13	4.13	4.08	1.36	5.28	25.35	26.45	27.69	- 0.91
18 8	841	27.90	±0.044	1±1.30	4.66	4.14	0.54	2.00	25.98	27.22	28.40	- 0.68
19	750	28.60	±0.044	土1.21	4.23	4.21	0.30	1.08	26.31	27.60	28 76	- 1.00
20 6	695	28.62	±0.052	±1.33	4.64	4.17	0.02	0.07	26.51	27.98	29.20	- 0.6
21	493	28.68	+0.062	1.38	4.81	4.18	0.06	0.21	26.38	27.67	29.23	- 0.99
22	328	28.80	±0.070	1.28	4.48	4.21	0,12	0.41	26.50	27.81	29.17	- 0.99
23 ¹	232	29.20	± 0.093	1+1.42	4.86	4.25	0.40	1.40	26.71	27.89	29.47	- 1.3

TABLE LV. The Circumference of the Waist.

TABLE LVI. The Span of Arms.

Age at nearest Birthday.	Observations.	Average.	Probable by Error of Average.	A Probable Deviation.	Probable De- W viation to Average.	W Relation of Average to Height, Standing.	Absolute Ann'l Increase of Average.	Relative Ann'l Increase of Average.	Percentile Grade.	Median or 50 Percentile Grade.	Percentile Grade.	Median Minus Average.
15	36	63.90	+0.130	±1.18	1.84%	100.0			62.89	64.50	66.51	+ 0.60
16	110	67.33	±0.091	±1.81	2.69	102.1	3.43	5.37	64.98	66.80	68.57	- 0.53
17	225	68.00	± 0.064	土1.74	2.56	101.1	0.77	1.14	66.15	67.90	69.75	- 0.10
18	245	68.25	\$ 20.060	土1.75	2.53	102.8	1.25	1.83	66.65	68.55	70.30	- 0.70
19	200	70.12	± 0.062	土1.72	2.45	103.3	03.0	1.15	67.25	69.03	70.87	- 1.09
20	165	70.10	± 0.072	11.85	2.64	102.2	-0.02	-0.03	67.56	69.40	71.45	- 0.70
21	103	70.67	± 0.076	±1.68	2.37	103.1	0.57	0.81	68.51	69.93	71.64	- 0.74
22	68	70.20	0.108	土1.98	2.81	102.5	-0.47	-0.66	67.62	69.60	71.75	- 0.60
23	46	71.00	±0 093	土1.42	2.00	103.4	0.80	1.14	68.93	69.93	71.56	- 1.07

Age at nearest Birthday.	No. of Observations.	Unit of Measurement.	Average.	Probable Bror of Average.	Probable Deviation.	Relation of Probable De- viation to Average	Relation of Average to Height, Standing.	Ann'l Increase of Average.	Relative Ann'l Increase of Average.	25 Percentile Grade.	Median or 50 Percentile Grade.	75 Percentile Grade.	Median Minus Average.
				E	u	<i>u</i> / <i>A</i>				1			
15	36		61.0	120.800	±9.12	15.0	95.4%			49.5	60.0	69.1	-1.0
16	110		71.5	+0.367	土7.30	10.2	108.0	10.50	17.20%	60.5	68.0	75.0	-3.5
17	325		77.5	+0.273	±7.33	9.0	115.6	5.97	8.30	68.0	75.2	82.6	-3.2
18	245		81.0	+0.245	+7.11	8.1	120.3	3.53	4.50	69.2	77.5	84.8	-3.5
19	200		85.0	+0.274	7.52	8.8	125.2	4.00	5.00	74.2	82.0	89.8	-3.0
20	165		77.0	+0.316	+8.03	9.2	127.0	2.00	5.00	76.2	83.8	92.5	-3.2
21	103	P	88.0	+0.365	+8.11	9.2	128.3	1.00	2.30	77.6	85.8	94.7	-2.2
22	68		86.5	+0.449	+8.14	9.4	126.5	-1.50	-1.70	74.7	85.0	91.8	-1.5
23	46		86.6	±0.421	±6.42	7.6	126.2	0.10	0.10	81.2	89.0	96.5	+2.4

TABLE LVIII. The Left Hand Squeeze.												
Age at nearest Birthday. No. of Observations.	Unit of Measurement.	Average.	Probable Error of Average.	Probable Deviation.	Relation of Probable De- viation to Average.	Relation of Average to Height, Standing.	Absolute Ann'l Increase of Average.	Relative Ann'l Increase of Average.	²⁵ Percentile Grade,	Median or 50 Percentile Grade.	75 Percentile Grade.	Median Minus Average.
15 36 16 110 17 225 18 245 19 200 20 166 21 103 22 68 23 46	66 7 7 8 8 8 8 9 8 8 9 8 8 9 8 8	0.0 6.6 0.0 3.0 5.0 7.4 5.8 4.7	L -0.790 -0.368 -0.274 -0.250 -0.273 -0.322 -0.327 -0.463 -0.466	$a \\ \pm 9.c6 \\ \pm 7.31 \\ \pm 7.43 \\ \pm 7.43 \\ \pm 7.43 \\ \pm 8.19 \\ \pm 7.26 \\ \pm 8.40 \\ \pm 7.10 \\ \pm 7.10$	a/A 15.1 10.4 9.7 9.0 9.0 9.6 8.3 9.8 8.3	A/11 94.0% 106.2 114.3 119.0 122.2 124.0 127.4 125.3 123.3	10.0 6.6 3.4 3.0 2.0 2.4 -1.6 -1.1	16.6% 9.1 4.4 3.8 2.4 2.8 —1.8 —1.3	46.3 56.3 66.6 67.7 72.6 73.9 77.2 74.5 78.8	56.4 65.0 73.5 75.0 81.5 82.0 84.5 83.8 83.8 85.0	62.1 70.3 81.0 82.2 87.8 92.0 91.8 91.9 90.9	$ \begin{array}{r} -3.6 \\ -5.0 \\ -3.1 \\ -5.0 \\ -1.5 \\ -3.0 \\ -2.9 \\ -2.0 \\ +0.3 \end{array} $

TABLE LVII. The Right Hand Squeeze.

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